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To

N. G. MAJUMDAR

Martyr to the cause

OF THE

PREHISTORIC ARCHAEOLOGY
OF SIND

d. 11 - 11 - '38

FOREWORD

The lectures on the prehistoric civilization of the Indus Valley were delivered at the University of Madras in 1935 being the third of the series of Sir William Meyer lectures. The subject of the Indus Valley Civilization has been dealt with in exhaustive publications of the Archaeological Survey of India to all of which I am indebted, particularly to Sir John Marshall's volumes on Mohenjodaro and Dr. E. J. H. Mackay's " Further Excavations " and also the smaller work on the Indus Civilization. For Harappa I have referred to the work of Mr. M. S. Vats which is now being published by the Department in a comprehensive monograph. As to the conclusions about human and animal remains I am indebted to the work of Dr. B. S. Guha and Dr. B. Prashad respectively. It is satisfactory for me to be able to place my views about the Indus civilization before the public as I had the privilege of working in the initial stages of the excavations at Mohenjodaro. It has not been possible for me to devote as much attention to the work as I should have liked to do owing to my multifarious duties. I crave the indulgence of the reader in this avowedly imperfect attempt to place a summary of the work done in this fascinating field.

New Delhi,
22nd December, 1938.

K. N. Dikshit.

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LECTURES ON THE PREHISTORIC CIVILIZATION OF THE INDUS VALLEY

By

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LECTURE I

Discovery, Scope and Extent of the Indus Valley Civilization

I think Indian History has all along been considered as just a collection of dates and names of kings and courtiers. But, latterly, the conception of History has been changing all over the world and now it includes the doings, the well being of the inhabitants, what the people knew and how they lived their daily lives in the different ages. If that is to be the main aim of History, then archæology, which, however imperfectly, tries to reconstruct the life lived by people in the past, by collecting and sifting their material remains, has a paramount claim to be called History in the proper sense of the word as now understood.

This country of ours is a very old country, as has been claimed by all of us for a very long time indeed. But in the absence of any real material remains which could be located in India and which could be definitely assigned to a very early period, many scholars who studied the subject and who were familiar with the relics of civilization in the past in other lands would not admit the claim of India to be considered on a par with other more ancient lands such as Greece, Elam or South Iran, Iraq and Egypt. But to anyone who would glance at the map of the old world, it would be quite patent that India is one of the most favoured regions where the development of the human culture is most likely to have occurred in the early history of the human race. The existence of man in the earlier stages of human progress depended more or less on his ability to attain mastery over the lower animals which led to what is called the 'hunting stage' of human history. In India, even at the present moment, geologists, with the help of archæologists, are endeavouring to find out some of the earliest localities where primitive man has lived and they are finding material for their study in the skulls which have been left in the area known as the Sivaliks at the foot of the Himalayas. Our present concern is not

with these early relics of a period when man was striving for existence in the midst of the rich fauna with which the Sivaliks were covered in the early days. That stage was long ago passed when civilized man made his first appearance in India. The history of the early civilizations is confined to such regions as Iraq and Egypt or the valley of the two rivers, the Euphrates and the Tigris, and the Nile, or the valley of the Karun in South Iran. But, in India, in the valleys of the Indus and the Ganges, which certainly cover an area much more extensive than any of the other valleys that I have mentioned, it was believed that conditions were probably not so favourable for the growth of human civilization as in the other countries. In spite of the fact that India possessed one of the earliest human documents which was transmitted from generation to generation by the human mouth without recourse to any written document,—I refer to the Rig Veda,—scholars and archæologists who have been studying the archæology of Egypt and Mesapotamia for over a hundred years were not at all satisfied that anything in India could bear comparison with or could be spoken of in the same breath as the remains in the other ancient tracts. The existence, however, of long fertile valleys such as those of the Ganges and the Indus must in itself have been considered a very great attraction by the inhabitants of the less favoured regions in the north-west and the course of history down the ages has demonstrated how invaders have become settled inhabitants adding to the complex of races in different stages of cultural development. To the west of India is the region, mostly desolate, but which, according to the conclusions which archæologists have come to, must have been the home of a number of races who migrated westward and eastward and were the progenitors of the main civilizations. India, in the absence of any of these materials which were not available until 12 years ago, presents a strange contrast to the strong unity and unbroken continuity of cultural history that we find in the valley of the Nile and to a less extent in the valley of the Euphrates and the Tigris. In the Nile valley we find that from the very earliest inhabitants they found a unity owing to the nature of the country which is watered only by the Nile. Where the Nile does not reach, you do not get anything like the means of subsistence of life. In the valley of the Euphrates and the Tigris, similarly, conditions were very favourable for the foundation of several cities which we see from the very early times and whose life was marred now and then by strife among themselves. The unity of culture which we find in Mesapotamia though somewhat different from what we find in the inhabitants of the valley of the Nile, is sufficiently in evidence as we find from the

archæological work which has been going on at most of these sites for the past fifty years. Archæologists have been busy in calculating the different ages which could be assigned to the cultures found at places like Tello (or Lagash), Ur of the Chaldies, Warka (or Uruk), Tel-el-Obeid, Kish and Jamdet-Nasr, the last of which has been considered to represent a stage of culture earlier than what is found elsewhere in Mesapotamia. All these have been worked out in the last few years and thereby even the settled history of Iraq has been pushed further by the recent discoveries of the last ten or fifteen years. In Egypt, the excavations go back to even the very early periods. Sir Flinders Petrie found some settlements on the hills fringing the Nile at a place called Badari which, he believed, went back to the 8th millennium B.C. His arguments which are always based on archæological evidence, included the examination of all the objects found in other pre-dynastic sites (i.e., sites going back beyond the old kingdom founded about 3500 B.C.). The number of dynasties which continued in unbroken succession was 26 and Egypt's history is then brought down to the time of the Greek conquest. In Mesapotamia, several dynasties which ruled over the different cities, have been long ago listed but to these lists archæologists have added several periods of what are known there also as pre-dynastic or early periods, before the rise of the dynasties of the cities of Ur, Erech and Kish. But in India, such results were impossible as there was no material for the earliest period such as has been left by Greek historians in both Babylon and Egypt on which work could be directed. The first effort in Indian archæology was thus naturally directed to the elucidation of geographical data derived from passing invaders like Alexander or itinerant pilgrims from other countries like Fa-Hien and Hieun-Tsang from China.

General Sir Alexander Cunningham, in his comprehensive survey of the remains in Northern India, was mainly guided by the descriptions of places left by Fa-Hien and Hieun-Tsang. As knowledge always proceeds from the known to the unknown, no particular attempts were made by the early archæologists in India to trace the earliest remains of civilization on Indian soil, although some seals with letters in pictographic script attracted the attention of that pioneer archæologist. The existence of seals indicated to him some early civilization and these came from only one place in the Punjab, namely, the ancient city of Harappa.

During the first twenty years of the reorganised archæological department in the 20th century under the able and distinguished

guidance of Sir John Marshall, systematic efforts were made at the Buddhist sites surveyed by General Cunningham but the excavations of the religious establishments and city sites in Northern India fell far short of the results achieved in other countries to the West. India was still in the unfortunate position of not being able to substantiate any claim to be considered as the home of a civilization extending beyond the days of the Persian Empire, although the literary evidence afforded by the oldest documents in the possession of the Hindus warranted a history reaching at the lowest computation to a thousand years before the age of the earliest material remains. At this stage, when the best that Indian archæology could investigate was Sanchi and Taxila, Nalanda and Saranath, Pataliputra and Bhita, there was a stalemate in archæological investigation. No sufficient funds for new exploration or excavation were available and the main energies of the Department were diverted to the preservation of the remains above the ground in different parts of India.

It was at this stage that the spirit of adventure and enthusiasm of the late Mr. R. D. Banerji prompted him to begin investigation at a site where he expected to find the remains of a Buddhist establishment in a somewhat forbidding and out of the way corner of Sind.

Having no scope for exploration in the Presidency of Bombay which constituted the main part of the Western Circle which was then in his charge, Mr. Banerji managed to scrape out some money from the grant at his disposal for the preservation of remains and early in 1923 commenced to dig around the remains of the stupa whose mud brick core stands at a height of about seventy feet from the surrounding plain. His expectations were realised when he had discovered some thirty cells ranged on the four sides of the quadrangular courtyard and evidence of their date was forthcoming in the shape of some coins of the Kushan period found in one of the cells, which have been identified as belonging to King Vasudeva. Not being satisfied with this, he penetrated deeper down and in the trench which was sunk at the foot of the mound he came upon a seal which at once brought to his mind the well known seals of Harappa which had pictographic writing. In his further diggings he found two more seals but even then the prehistoric character of his finds was not fully apparent to him. Rai Bahadur Daya Ram Sahni who was about the same time excavating at Harappa, had also discovered seals, painted pottery, terracotta and other objects which no doubt showed an entirely different culture

from what was known from the excavations of other Indian sites. Sir John Marshall, the Director-General of Archæology in India, then perceived a striking resemblance between the finds made at the two sites and in the summer of 1924 assembled the materials from these sites and the painted pottery which had been years ago found in Baluchistan. When he had established affinities between these different relics of civilization about which nothing was up to that moment known, he immediately published the results in the *Illustrated London News* where he described the two cities as being an Indian *Tiryns* and *Mycenae*. The comparison was made to excite the interest of scholars all over the world and concentrate their attention on the fact that ruined cities of an unknown civilization had been found. I had occasion to see Tiryns and Mycenae myself but I found to my astonishment that neither the age nor the extent and appearance of the cities is comparable to either Harappa or Mohenjodaro. The site of Tiryns is about ten times the size of this hall while that of Mycenae though much more extensive, is on the top of a hill and does not show that wide expanse which we associate with Mohenjodaro and Harappa. But these two places were taken up for excavation by Schliemann, one of the first archæologists, and the interest which he created by his diggings roused such enthusiasm in different countries, that excavation was laid for once on its proper basis.

The mound that attracted the attention of archæologists first is perched on a part of the site which is cut off from the rest. (Plate I). The plan of the whole settlement bears some resemblance to the map of the British Isles. The stupa and other mounds in the group which are about a quarter of a mile away from the main site must have been a special area and the site of the highest mound, which, by reason of having been selected by the later Buddhists who came on the spot some 2500 years later, must have been a very important place even when the city was flourishing. It has not been possible to probe into its interior owing to the presence of the well laid out Buddhist stupa and monastery around it but undoubtedly it will be excavated after the upper remains have been removed. Perhaps, it will be found to contain the most important or sacred of the shrines of the Indus valley people. The other mounds in the vicinity have also gathered together a height which is, on the whole, greater than that of the main city. In the main city, we can distinguish here and there some spots which are more elevated than the rest. There are mounds which rise 25 feet or even more above

the surroundings. The eastern portion of the city is more or less flat although the elevation is about fifteen feet above the plain. It fell at this stage to me to continue the work which Mr. Banerji had been doing and I found that beyond some diggings in the mound near the stupa, the main city mound had been untouched.

I began by digging trenches in the different parts of the mound one of which extends right from one end to the other. The site of Harappa is even bigger than Mohenjodaro. The main mounds are situated on a dry bed of the River Ravi and they form a right angled triangle with rectangular extensions. The modern village of Harappa is close to the mounds whereas in Mohenjodaro, there is nothing within a mile and a half of the deserted ruins. But the unfortunate part about Harappa, which is an isolated mound in the centre of the Punjab, is that it fell into the hands of brick diggers. The climax came when the railway between Lahore and Multan which runs a few miles from Harappa was laid. The contractor who laid the ballast for the line casting envious eyes on the place took as much material consisting of bricks from the site as he could. This must be considered one of the greatest losses to Indian archæology. If Harappa had been preserved to the same extent as Mohenjodaro, there is no doubt that it would have proved a veritable mine of information as well as a great addition to our knowledge of the culture of the Indus valley people. However, at Harappa, on a level piece of ground which never attracted the attention of the vandals, we have been lucky enough to trace a cemetery in which the mortal remains of at least a section of the people of the Indus valley have been found. These skeletal remains have been found in plenty and they give an idea of the people. Animal remains from Harappa tell us of the beasts that roamed about the land. Wherever excavations have been carried out in these mounds at Harappa, they have brought to light fragmentary remains of wells and houses and we never get anything like the complete plans of houses and streets as in Mohenjodaro.

A bird's eye view of the site of Mohenjodaro gives us an idea of conditions five thousand years ago. We find in the neighbourhood of the stupa which gave us the clue, a number of regularly laid out streets lined with houses. We also find another area in which there are houses with big halls and rectangular pillars to support the roof, a peculiarity not found in most other places. In the higher site which was dug extensively, you can see easily the streets connected with one another by lanes. We also

see another cross street which forms the present channel of communication between Mohenjodaro and the outside and which appears to be as old as the ancient city. The junction of these two streets has been called by some scholars as "The Oxford Circus of Mohenjodaro". As will be seen, a very large portion of Mohenjodaro has yet to be excavated, for the total area which has so far been brought to light is not even a tenth of what clearly must have been the extent of the city.

Over a year subsequent to Mr. Banerji's excavations the foundations of our present knowledge of what has been called the 'Indus civilization' were laid. The work thus begun in the year 1922-23 was continued for a decade before it was discontinued under the stress of stringency which overtook the finances of the country in the year 1931. The interest created in Indian archæology by the discoveries during the decade both in this country and outside its borders is so tremendous that even financial stringency is not able to suppress it altogether and I am hopeful that as time passes on, our knowledge of this civilization is bound to increase rapidly and that the Universities and learned societies of India will take an increasing share in this investigation. Already, an American Society has obtained from the Government of India a licence to carry on excavations at Chanhudaro.

The scope for investigation of this kind is not at all limited in any way as Mohenjodaro and Harappa are about four hundred miles apart and quite a large number of other sites also have been brought to light. Beginning from the north of the Punjab, investigations have been carried on in a number of places and they have brought to light more than one site. In Kotla Nihang, in the district of Ambala near the town of Rupar on the Sutlej, objects have been discovered by Mr. Vats which are so identical with those found at Harappa and Mohenjodaro that a comparison of these will show how entirely the civilization of that place must be considered to be within the ambit of the Indus valley civilization. Almost all the objects found here are typical of the Indus sites—triangular terracotta cakes, terracotta beads, rings of pottery, pieces of bangles, pottery, etc. The presence of such objects in places three or four hundred miles apart and close to the Ganges valley itself raises the hope that further investigation in the Upper Doab of the Ganges and the Jumna is likely to yield more material and then we shall be compelled to call the civilisation which we call the Indus Civilization today, as the Proto-Indian civilization.

In the area marked A, the site first taken up by me for excavation I brought to light a lane with blocks of houses on either side. In the early stages of our digging, we were inclined to consider any room which could not be explained as having been regularly inhabited, as a shrine, although there was not much ground to show that they were used for religious purposes. In one room was found a well which did not go deep enough for watering purposes. Therefore, we presumed that it was a well in which offerings were made. But in a later case, there was no such significance to be attached. We found in several cases, wells belonging to three different periods or wells which had been abandoned after they had been in use for a hundred or two hundred years. Numerous drains were also unearthed. It was also noticed that at various points of intersection of drains, little tanks or drainage pools had been constructed to allow the water to deposit its silt before proceeding into the main drains. In some cases, plans of whole houses were found to be very clear. Wells were found in the parts of houses very close to the street so that the waste water could be easily taken to the drains. Practically every house had its own well and close to the well were well-laid baths.

The work at Mohenjodaro was naturally followed up in all the area in which it was likely that the culture would have extended and from the year 1925 when the city was first touched, it was seen that mounds which yielded antiquities similar to those which were excavated in Mohenjodaro were reported by Collectors to whom samples of the pottery and other typical objects from Mohenjodaro had been sent. Thereafter, there was a deliberate search for these and in 1929 work was entrusted to another Indian scholar, Mr. N. G. Majumdar and the results of his work are contained in the volume which has been recently published. In the map of Sind prepared by Mr. Majumdar, it will be seen that the sites, which he discovered as belonging to the Indus culture, follow certain lines —the old lines of communication between Southern Sind and Northern Sind through the hill range which approached the Indus near Laki. The entire province of Sind was investigated and it was found that remains were more plentiful in the hill region than in the plains in the east.

The main criterion by which to judge whether a site belongs to the chalcolithic period is the presence on the surface of stone implements known as scrapers. These were generally knocked off from the cores of flint. Near Sukkar, these flints are plentiful. Being

of no use to the modern inhabitants, these scrapers are generally left undisturbed at ancient sites. Along with pottery which is the most important of data, they are the most useful objects whereby archæologists could distinguish the period.

Recently, investigation has been carried on in Khairpur State on the east bank of the Indus and in Limbdi state in Kathiawar with the result that several sites yielding antiquities typical of the Indus civilisation have been found. The exact correlation of these with the main Indus culture is not yet known, but at least one of the phases of culture in Khairpur must be relegated to an earlier period than Mohenjodaro.

On the eastern bank of the river, there is another site named Chanhudaro which was discovered by Mr. Majumdar, which has been taken up for excavation by the American Society. It is a fairly large town consisting of three mounds and a large variety of objects have been discovered at this site including painted pottery which is another characteristic of this civilization. The two large jars found by Mr. Majumdar show a painted pattern consisting of overlapping or intersecting circles, typical of the Indus region. Among the materials recovered from this site are other objects typical of the Indus culture and I would draw particular attention to the seals found. They show interesting objects, one a tree, probably used for worship, and the other a goat about which we shall deal later when discussing the religion of the Indus valley people. The variety of antiquities found here has led to its selection by the excavators from America.

Coming to the west bank of the Indus, a mound known as Lohumjo Daro near Piaro Goth Railway Station was brought to my notice in 1925. This mound has been further examined by Mr. Majumdar, who recovered from it several objects typical of Indus culture along with some others on pottery to which he assigns a later period. A number of sites have been found further south by Mr. Majumdar, where further varieties of painted pottery were discovered. Some of the sites in the hills are situated near springs where the Indus people must have found it convenient to form settlements.

An important site which is next only to Mohenjodaro in extent is near a village called Ali Murad which must have stood at an important junction where traffic from the main Indus valley passed through hills immediately to the west of Sind. Ghazi Shah

is another promising site near the Manchar Lake, where Mr. Majumdar discovered a number of important antiquities. The excavation of these sites is likely to take a number of investigators and probably decades but for the present we must remain content with the observation that the extent of the culture can be clearly visualised by the number and the extent of the mounds.

So far we have considered the question of the extension of the Mohenjodaro culture in other parts of India, but its connections with countries further west are even more important and have enabled investigators to date it with a certain degree of accuracy. The investigations of Sir Aurel Stein in northern and southern Baluchistan and South Persia have thrown an immense flood of light on the question of the affinities of the Indus culture and have forged links which no longer allow us to think of the Indus people as isolated from the other cultures further west in Elam and Sumer. The excavations conducted at Nal in Baluchistan by Mr. H. Hargreaves almost due west of Mohenjodaro brought to light a cemetery from which a large collection of fine painted pottery with polychrome treatment was discovered. The pottery brought to light in the course of Sir Aurel Stein's explorations in different parts of Baluchistan can be roughly classified either with the light polychrome ware of Nal or with the black and red pottery characteristic of the Indus sites. There is no doubt that the large number of sites akin to the Indus civilization found in Baluchistan is due to the fact that the subsequent desiccation which overtook this region at the end of the Indus period, has left the extant remains comparatively free from the disturbances to which they were subjected in the Sind valley and the more fertile tracts of India. It is due to the energy of this veteran archæologist that we now have material from sites like Kulli and Mehi, Siah-Damb and Spet-damb, Suktagen-dor and Jiwanri available for comparison and study. Not content with these researches, which have earned for him the highest honours, this indefatigable scholar is now carrying on his investigation in South Persia with a view to complete the chain which it has been his privilege to trace between the cultural areas of Sumer and Elam on the one hand and India on the other. Would that his example may always stimulate generations of archæologists to exert their utmost in the investigation of the past relics which man has left in his peregrination during the earlier stages of development!

If we compare the designs of the pottery of the different countries from Persia to Baluchistan, it will be noticed that in the

Baluchistan ware, the horns of the wild goat or the ibex are conspicuous. The presence of the ibex has been traced in Persian pottery as well and although the treatment is different it has led archæologists to bring all these countries in relation with one another. One design which has been found in the Mohenjodaro and Baluchistan pottery is that of a circle with six skirls inside, the 'svastika'. It will thus be seen that if we place pottery in its proper correlation with the different countries in which it is found, we can draw the inference that the Mohenjodaro pottery was approximately contemporary with that discovered in Baluchistan.

The conditions that existed in Baluchistan and Sind five thousand years ago must have been much more favourable for human habitation than now. The main reason why civilization seems to have deserted this region is its gradual drying up which must have been caused by some change in the course of the monsoon, which at one time must have been favourable to Sind and probably also a part of Baluchistan. The pottery which has been found in these regions has been connected with Seistan and India. Several trace its development in Susa and its further development in Mesapotamia. This brings us to the point that the civilization that flourished on the main highlands of Baluchistan and Persia was connected with the civilizations on either side.

Having traced the extent of the Indus culture on the west, let us now see whether its extension can be seen eastward. I referred to the possibility of further finds being made in the Gangetic valley which will enable us to have a still further change in the name of the civilization now known as the Indus civilization. It will be seen from the representations of the various types of copper implements discovered in India long before the discovery of the Indus civilization that a large number of copper swords, celts, and human shaped ornaments were known. A large number of such sites have been reported and it is very probable that if the localities from which these relics of the copper civilization of the United Provinces are traced and further investigated they will yield material which will forge the links between the Indus civilization and the later Indian civilization of the historic times.

One particular point which may be mentioned here about the human shaped copper implement is that it bears resemblance to the human sign among the pictographs that have been found in Mohenjodaro. This leads us to the hope that there may be a possibility of finding other contemporary or later examples of the

Indus pictographs. It will enable us to see whether the opinion of Prof. Langdon that the Brahmi script is derived from the script of Mohenjodaro is sound, or not. In the present state of our knowledge of Indian history, with two thousand years' history almost non-existent, it is not possible to hazard any conjecture regarding the connection which the Indus people may have had with the Gangetic valley. But the investigations of General Cunningham and his assistants have discovered places where not only copper tools but pictographs, carnelian beads and objects exactly similar to what are found in the Indus valley were handled in the lower Gangetic valley in the districts of Ghazipur and Benares. Taking these objects from the upper U.P. which are again found in the Gangetic valley, there can be established a continuous chain of sites from Bijnor and Budaun in the west down to Benares and Patna on the east. Recently, the drainage operations conducted by the municipality of Patna have brought to light at a great depth valuable antiquities of the Mauryan period. Thus owing to the presence of a large amount of silt covering the lowest levels, it is even more difficult to work to the earlier levels in the Gangetic valley than in Sind. Probably we shall have to content ourselves for the present with such work in the sites where copper objects are found at comparatively higher levels. Another extension to the South-east of the Indus civilization which has been brought to light very recently is in the Limbdi State in Kathiawar. A place called Rangpur has yielded a number of patterns of pottery and implements which are exactly similar to those found at Mohenjodaro. It is hoped that the investigations in this region will yield more definite evidence and thereafter it is very likely that the extension of this culture can be traced in the region around the Narbada and Tapti basins. The regions around Jaipur, Bikaner and Jaisalmer have not so far been explored although it is undoubted that the search for copper and other minerals must have brought the Indus people in close commercial association with this area. There is greater hope of obtaining undisturbed sites in these drier tracts than in the Gangetic valley which has been densely populated and intensely cultivated throughout the ages.

At no great distance from these newly discovered places is the Gulf of Cambay. It was at the ports of Cambay and Broach that the carnelian industry of India was concentrated and the extensive use of this material in the Indus cities renders it almost certain that further investigation in the Narbada valley will bring to light other settlements of that period. Considering that the conch shell which is typical of the Indus valley civilization and which seems to have

been in extensive use in the Indus cities was obtained from the south-east coast of the Madras Presidency, it would not be too much to hope that a thorough investigation of the area in the Tinnevelly Dt. and the neighbouring regions such as the ancient sea-port of Korkai will one day lead to the discovery of some site which would be contemporary with or even a little later than the Indus civilization.

It will thus be seen that the coastal region of the peninsula, the greater portion of Kathiawar, the valleys of the North West Frontier Province, the bulk of Sind and the Punjab and at least the upper Doab if not the whole of the Gangetic valley and possibly the whole of Rajputana are the regions which are likely to have been comprised within the limits of this civilization.

Let me conclude by expressing the hope that in Madras investigators will be found who will have the honour of unearthing some antiquities proving the extension of this civilization further to the south which, I need hardly say, will be a very important result to achieve indeed!

LECTURE II

Building, Architecture and Town Planning

The earliest city dwellers of India have left enough material behind them to enable us to measure their ability in planning towns and providing them with the amenities of life as then understood. It is clear that the builders of Mohenjodaro and Harappa had developed their skill in course of centuries and were not indebted to any other predecessors on Indian soil; nor do they appear to have left behind them any regular continuity of tradition at least in the areas inhabited by them so as to enable us to trace the development (or even degeneration) of their technique stage by stage, and it will possibly take several decades of work in the Gangetic valley sites before we are able to form some idea of the measure in which their technical skill was transmitted to later generations in other regions. So far as the Indus valley is concerned the city dwellers of the Indus valley appear to be almost exotic to the soil, although it is clear that in the hilly regions of western Sind there were small settlements of hill-men and lake-dwellers, who built stone houses and pile dwellings at the same time as the more advanced people of the plains evolved types of architecture and town planning that are the admiration of a much later age.

Of the cities and towns built in the Indus valley, Harappa in the Punjab and Mohenjodaro in Sind seem to have been the capitals; the former, though more extensive, is very fragmentarily preserved so as not to enable us to study its complete lay-out. In Mohenjodaro, however, it has been possible to study the planning of the houses in relation to the streets, lanes and open spaces on a sufficiently large scale. (Cf. Plate II-a.) The first essentials of a well planned town are a site free from any encumbrances and an authority strong enough to enforce on the citizens strict discipline in preserving the alignment of the paths and roads. Fortunately in this respect the authorities at Mohenjodaro, who were probably among the world's pioneers in city construction, were very successful. The site, which was undoubtedly chosen owing to its proximity to the river Indus or a navigable branch of it, was sufficiently extensive and level, and the inhabitants were apparently energetic, prosperous and amenable to a strict control. It, however, appears that the river in the neighbourhood, which was the *raison-de-etre* of the

existence of the town, also caused rapid rise in the surrounding level, which rendered it necessary to rebuild the city at not very long intervals and finally among other causes, led to the evacuation of the city. The meticulous accuracy of the earlier periods of building is not apparent in the later levels, and it appears that authorities in the later periods were unable to prevent private owners from encroaching on the streets, particularly as there was less space available for building, as the level of the city rose higher and higher.

The streets of Mohenjodaro were planned to run from East to West and from North to South without much deviation at least in the more flourishing period of its history. The main thoroughfares were laid out as wide as the requirements of traffic demanded, and in one case we find a road actually 33′ wide, which must have accommodated at least three lines of wheeled traffic as then known, besides pedestrians (Plate III-b). This thoroughfare, which runs at least three quarters of a mile, is crossed at rightangles by other roads of lesser width averaging about 18′. In the area lying to the west of the main street, in which probably the most important religious establishments were located, the roads are smaller in width, ranging from 9′ to 13′. The idea of paving the entire lengths of roads does not seem to have been followed, although attempts at consolidating the road surface by ramming broken brick and pottery over a substratum of clay, are apparent in a few places. It appears likely that the surface of the road was kept clean, and it is possible that the dust nuisance may have been mitigated by the sprinkling of water

The smaller lanes of Mohenjodaro have been better preserved owing probably to the fact that there was less wear and tear in their case than on the main streets. Actually, the width of these lanes tended slightly to increase inasmuch as the houses flanking them were built with a distinct batter. The great height, sometimes about 20′ to 25′, of the walls, still preserved in some of the lanes, show the repairs which they underwent during different periods as the level of the city rose. The contrast of the superior work of the earlier period with the jerry-built structures of the later city is evident almost everywhere, particularly in the masonry of the wells, which were built up as the water level rose.

The bricks used for the building of houses in Mohenjodaro and Harappa are well burnt and of excellent proportions, which have excited the admiration of modern engineers in Sind. The

most usual size of burnt bricks is 11″ by 5¼″ or 5½″ with a thickness of 2¼″ to 2¾″. At no other period has the Indian builder ever struck upon this most business-like size of bricks, and it is remarkable that the evolution of bricks in the historic period from Asoka commences with bricks of about double the length and breadth of the Indus Valley brick. It gradually diminishes in the Kushana, Gupta and mediæval periods, but never attains the true proportion of length, breadth and thickness as 1 : ½ : ¼, which makes for an excellent bond. That this ideal proportion was not entirely forgotten is shown by the fact that a later text (Kaśyapa Samhita) prescribes a proportion of 10 fingers of length to 5 fingers of width and half of the latter for thickness ; but it is doubtful whether in actual practice the masons ever followed this in the historic period. Any way, it is clear that the burnt brick of the Indus Civilization has been unexcelled in India and is not comparable with any attempts made in ancient Sumer, Egypt and other countries, till we come down to the Roman times. The abundance of harder material like stone available in Egypt and the excellence of bitumen as a cementing material in Sumer may not have urged these ancient countries to make experiments with brick, but the Indus Valley People had to evolve their basic building material purely out of the alluvial clay with which they were surrounded, and they seem to have utilized their opportunity to the best account. The bricks were apparently manufactured in open moulds by the open stack method with wood fuel, as was done in all parts of Northern India before the advent of the closed kiln and coal fuel. The use of unburnt bricks is confined in Mohenjodaro to foundations (in rare cases) and most commonly to filling in large areas in order to bring them up to a higher level. The greater use of *kachcha* or unburnt brick in present day Sind is an undoubted indication of the change in climatic conditions, which has come over during the last four thousand years. It is reasonable to suppose that the path of the monsoon, which is deflected towards Sind only occasionally and once in several years, at one time regularly included the Kirthar range and the entire lower valley of the Indus. With a climate approximating more to that of the Upper Gangetic Valley at the present day, it is quite conceivable that burnt brick was essential in the construction of houses, if a reasonable degree of comfort was aimed at. It is, however, surprising that with such mastery over bricks, no ornamental features of architecture or decorative brick work were attempted. The practice of varying the monotony of the regular courses of stretchers alternating with headers, with bricks laid on edge is the only attempt at decoration, if it may be so called.

The plain matter-of-fact and business-like character of the people, who were responsible for the Indus civilization, is illustrated by the exterior of the houses. There is neither the grandeur of Egyptian architecture nor even the decorative effect of pilastered facades as in Sumer, but for the purpose of living, the commodious and well-built houses discovered in Mohenjodaro are far superior to any dwellings of the common people at Ur or Kish or any Early Kingdom Egyptian town. It is remarkable that most of the entrances of houses, which had a frontage both on the main streets and the small lanes, were from the latter—a course, which was probably suggested by considerations of safety as well as superstition. The existence of isolated rooms at the corners of streets and the position of the front rooms of houses have led to the inference that watch and ward arrangements for different quarters of the city and individual houses existed. It does not. however, appear that beyond cat burglars there were offences against property, and, in any case, no evidence of violent breaking of houses or of arms of an offensive or defensive character has been recovered. Most of the houses in Mohenjodaro had more than one floor, although the accommodation on the first floor must have been limited to a small number of sleeping apartments. Except for the streets, there were not many gaps between the houses and the continuity of well-built brick houses in the streets and lanes indicates an almost even level of the standard of city life, unless the poorest classes had temporary buildings of flimsy materials outside the limits of the city. The average small house was about 30′ × 27′ and consisted of at least 4 or 5 living rooms. Larger houses are double the size with more rooms, and there are instances of houses with as many as 30 rooms. In general, the size of rooms is much smaller than in modern construction and the thickness of walls much greater, which was probably necessary owing to the poor cementing material and the necessity of sustaining the weight of more than one storey. The surface of the walls has sometimes been found to have traces of a mud plaster with bran. In some cases the small square holes left in the tops of walls indicate the place where beams supporting the roof once existed. Above the beams and the cross-beams a matting of reed thickly coated with mud formed the roof, as in a large majority of buildings in modern Sind.

The arrangement of the rooms follows generally the traditional plan still in vogue in Northern India and in other oriental countries, namely, of a courtyard surrounded by rooms. As there were no other places where domestic cattle could be kept, it may

be assumed that they occupied some space in the courtyard and that fireplaces occupied other corners of the court. In the case of bigger houses, it is possible that there were joint families of large size as in modern times, and in some cases the partition walls in a big block may indicate the subsequent division of large houses between brothers, etc. Some of the houses are so constructed as to leave a small space between their boundary walls and those of the neighbouring houses, possibly to avoid trouble and dispute involved in having common party walls.

The furniture and fittings of the houses must have been of the simplest description. There were big jars fixed in the floor for storage of grain, and there must have been reed mats on the floors and small wooden or reed stools of which the pattern is to be seen on the seals. Among the pictographs have been recognized symbols for chairs and tables, but these must in no way be supposed to resemble their modern counterparts. In rare cases, deep recesses or niches have been found in the walls, which may have been fitted as cup-boards.

The most important feature of Mohenjodaro houses is the presence in them of one or more bath rooms, the floors of which were carefully laid, and were connected by means of drainage channels with the main street. The adequate water supply in the shape of carefully built and maintained wells, both private and public, was efficiently disposed of by a system of drainage far better than in modern towns of Sind. The use of very carefully cut and rubbed bricks for waterchutes, along which spill water from wells and baths was carried, the public and private masonry drains, are some of the most striking features of this ancient city. The bath rooms are square or rectangular with a pavement usually sloping towards one corner provided with an outlet of water. In order to ensure the watertight condition of the floor it was sometimes provided with a bed of pottery fragments. Earthenware pipes have also occasionally been used to carry water from higher levels. The drainage channels have, in many cases, undergone changes corresponding to the rise in the levels of the houses, and at places 2 or 3 changes can be noticed side by side and one above the other. On the whole, it is clear that the earliest citizens of India had a scrupulous regard for personal cleanliness and sanitation, and it is probable that the ceremonial regard of the Hindu for a daily bath is descended regularly from the early inhabitant of Sind.

Except a few buildings, such as the Great Bathing establishment at Mohenjodaro and the great store house at Harappa, very few buildings of any remarkable proportions have come to light. The Great Bath, (Plate III-a) which is about 40′ in length by 23′ in width, is approachable by stair-case or a *Ghat*, of which the treads were recessed at the ends to take wooden planks. A paved walk surrounded the top of the bath and around it is a fenestrated wall with a cloister walk 7′ wide running almost around the Bath on all sides. Outside this, there are a number of rooms, which were probably occupied by the bathers or supervisors of the establishment. The only instance in which bitumen (undoubtedly obtained from a long distance) is used in masonry in order to make it watertight, is in the construction of this Great Bath. It is apparent that the bath used to be filled with water at regular intervals from the three wells in the neighbourhood, and there are arrangements for carefully emptying the bath through a square hole in a corner into a passage whence it was carried through a culvert high enough to allow a man to pass through it. This establishment was thus very important and unique, and it is possible that the visitors to the main temple, which stood at a short distance from the Bath, used it for ceremonial purposes. The existence of a group of small bath rooms at a short distance of the Great Bath, each of which is provided with a stairway, probably leading to a cell above, indicates the existence of an order of holy men, who were required to perform ablutions very frequently.

The wells at Mohenjodaro are a remarkable feature of the city, but in Harappa they are much less in evidence. It speaks volumes for the technical perfection of the builders that most of the wells built thousands of years ago are in perfect working order up to the present day, and it was only necessary to remove the debris and silt up to the present level so as to use them for the supply of drinking water. In fact, water had to be brought for the use of the camp and the labour employed in excavation from a distance of about two miles, until the re-excavation of the ancient wells provided a better supply than the modern *kachcha* wells. Bricks used for lining the wells were cut and rubbed so as to form a ring of brick-work of wedge-shaped bricks. Occasionally, it is found that wells constructed by the more affluent house owners in their own courtyards for their private supply were made accessible to outsiders by opening a passage to the public road, although for the inmates of the house privacy was secured by a thin partition. Around the wells there are generally found carefully paved floors, in which marks of jars placed by carriers awaiting their turn are

occasionally found. In the prosperous intermediate period of Mohenjodaro pavements of round bricks consisted of two or three thick courses (sometimes even five), which must have prevented the possibility of water lodging in the vicinity of the wells. As in the present day villages, the wells must have been the centres of gossip in the different quarters of Mohenjodaro. The means of drawing water must have been a rope, and in some cases there are marks made by the strings against the steening of the wells. The use of a pulley wheel for lowering the water pot inside the wells can be inferred from certain models in terracotta. The rise in the level of the city during the centuries of its existence and the rise of the water level, particularly after the inundations of the Indus made it necessary from time to time to rebuild the wells, and in some cases three periods of rebuilding can be easily distinguished in the renewed steening of the wells, each with its corresponding floor around. New wells are not in evidence in the upper levels of this city, and it seems that in the later periods, the waning prosperity of the inhabitants just permitted them to repair with much inferior masonry, the excellent wells that had been left by their ancestors. Owing to the fact that the difference in the water level of the earliest period of occupation and the present times is not less than 20ft., it has been found impossible to dig down to the bottom of wells, but it is likely that important finds will be made in case the water is pumped out and the deposits at the bottom examined at least in a few select cases.

The conservancy and sanitation of private houses and public roads observed in Mohenjodaro appears to have been far ahead of any other contemporary city or even of many modern towns in India. In some houses regular privies of the Indian type have been found, and there is reason to suppose that a municipal system of removal of night soil must have existed. In some cases the channels outside the walls appear to be intended for refuse water from the upper storey, and it is likely that these were connected with privies or drains situated in the upper part of the house. The refuse water from wells and privies was carefully brought to the main underground brick-built drain running in the lane or street, and in some cases square-shaped brick receptacles are fouded at the mouth of house connections, so that solid matter may settle down at the bottom. In some cases soak jars are found at the mouth of the drains issuing from houses, which must have been periodically cleaned and the sediment removed. The main drainage channels running in the streets were provided with brick or stone covers so as to facilitate periodical inspection and clearance.

In cases where long drainage channels could not be opened throughout their length, brick-lined sumps were provided from which the adjacent channels could be cleared by rods. Small heaps of sand still lying by the side of some of the drains testify to the efficiency with which the conservancy was looked after. The careful way in which drainage channels were carried across corners of lanes shows the care devoted to the subject of proper drainage, which generally exceeds that shown to living rooms in buildings. The only defect from the modern standpoint that may sometimes be found in the drains is their proximity to wells, which supplied the drinking water, and the consequent likelihood of contamination by seepage.

As the level of the city arose it was inevitable that the older drains connected with the earlier city should be replaced by new ones, although sometimes the makeshift of raising the side walls was also tried. The new drains were built on the top of the older ones generally with fresh bricks but sometimes also by dismantling the earlier ones. As the main street drainage approached the limits of the city, we find the outfalls in the channel and at the ends large culverts about 4 to 5 feet in height and 2′4″ in width roofed over with corbelled arches. These were intended to serve both for the requirements of ordinary as well as storm water drainage and are very finely executed and outstanding examples of the marvellous engineering skill possessed by these ancient Indians.

At Harappa the only remarkable buildings or group of buildings discovered are those known as the parallel wall or granary area (Plate III-c). These consist of a series of parallel walls each 52 ft. long standing in two sections divided by a passage 23 ft. broad. The walls are of an extraordinary thickness being about 9 ft. thick and stand in groups of pairs each divided by about 5 ft. from each other, and one pair separated from another by a distance of some 17 ft. This building is likely to have been a treasury for grain or other dues received by the State or the Municipal administration. In Mohenjodaro itself the largest buildings that have been discovered measure 242′ in length by 112′ in breadth and another of slightly smaller dimensions. Each of these has several courtyards surrounded by living rooms, store rooms, etc., which indicate that they must have been in the occupation of a person holding high position and a large family and dependants. In the absence, however, of any distinctive features in the construction or size of buildings or rooms, it is not possible to say definitely whether it was the palace of a commercial magnate

or a prince. In one area at Mohenjodaro a hall of considerable dimensions (85′ square) with a roof supported by 20 brick piers arranged in four aisles is found. It is possible that this was used for some public purpose of the community such as religious congregation, as it is in the neighbourhood of the great bath and possibly the main temple underlying the Buddhist Stupa, but Dr. Mackay considers it to be a market place. At some places in Mohenjodaro, buildings with large rooms and strong floors having regular depressions sunk in the floor have been found, particularly at convenient corners of roads. In one case it has been supposed that large earthen jars rested on the floor over these sunken depressions and the building was a restaurant where liquor was served. It is, however, more likely to have been a charitable watering place (modern *Piao*) as the tradition of founding free watering places is more in accordance with Indian custom and the requirements of the Indian climate than the establishment of a public tavern or restaurant.

There is very little in the different quarters of the cities so far excavated to indicate the classes of people by whom they were inhabited. From the fact that a large number of kilns and partially burnt quantities of pottery were found, it has been concluded that one part of the city of Mohenjodaro was in later times given over for the occupation of the potters, but unless the large population of Mohenjodaro in earlier times had dwindled down it is unlikely that potters could occupy any important quarter except on the outskirts of the city. At Harappa a number of humble dwellings each with a limited accommodation and a curved side wall, possibly for a small door stopping against it, have been taken as the workmen's quarters. The settlement is, however, not so well planned as the workmen's quarters at Tel-el Amarna in Egypt. Shops with small ante-rooms for keeping surplus stocks can be inferred in certain localities of Mohenjodaro, but such two-room tenements are not very common in every quarter of the city.

The contemporaries of the citizens of Mohenjodaro, who lived in the adjoining hills to the west, built structures mostly in stone, the locally available material. The foundations of their buildings consisted of rubble stone and of the superstructure of the walls above, the lower part up to a height of 2′ or 3′ was built of blocks of stone laid in mud. The upper part of the walls as well as the roof probably consisted of reeds and leaves of trees strengthened by a quantity of wood. The settlements around the Manchar Lake, which may have mostly consisted of fishermen, must have been

composed of piles as in the case of the lake habitations of Switzerland.

Some evidence of the knowledge of fortification is available in the case of settlements on the hills, such as Kohtras in Karachi District, where Mr. N. G. Majumdar found two walls one within the other, built of stone boulders in what many may be called cyclopean masonry. At another settlement known as Ali Murad commanding a pass in the Kirthar range, a rampart wall of irregularly dressed stone blocks was found, being probably the circumvallation around this town which extending for about half a mile, was one of the biggest sites in western Sind. It is likely that the inhabitants of these hilly regions were not always on friendly terms with the citizens of Mohenjodaro and may have proved a menace on several occasions.

LECTURE III

The Life and Arts of the Indus People.

In the countries of the Near East and particularly in Egypt it has been possible to reconstruct the life of the ancient inhabitants lived thousands of years ago from the abundant material left in the tombs. In ancient Egypt the claims of the dead were considered stronger than those of the living, and careful provision was made in the tombs for not only ordinary means of subsistence, but also luxuries. In the land of the Nile, the tombs, Mustabas and Pyramids have yielded far more material for the reconstruction of life as it was lived in Egypt than elsewhere. In India, however, the line between life and death must have been very great indeed, inasmuch as of all contemporary people, the Indus people alone have left the least trace of their dead. Judging from the paintings and the tombs of Egypt the life lived by the common people was very different from that of the king and the rich people and officials, who surrounded him. In India, however, the average citizen of the great Indus cities appears to have enjoyed a greater measure of personal freedom and an equitable share of the amenities of life than his contemporaries in other countries.

If there was an oligarchy or aristocracy in power at a city like Mohenjodaro, it must have been of the nature of a commercial oligarchy under whom the common people appear to have fared quite well. The Municipal administration was efficient, of which there is ample evidence in the remains at Mohenjodaro in the shape of a well-planned and carefully maintained drainage system. A watch and ward system for different quarters, the provision of large caravan-serais and public store-houses point to a highly organised civic life. In the administration of the affairs of the city, Mohenjodaro must have contained the germ of the Board system in the Mauryan period or the City Council of the Gupta period. In the latter, besides the chief merchant who was the Mayor, there was a place for the foremost of the caravan trade, the chief artisan and the foremost writer. We can well picture that the prosperity of Mohenjodaro was due primarily to the trade both inland and foreign. For this it was much more advantageously situated than Harappa, being near the mouth of the Indus, which was the artery of the trade of the country and was close to the open sea. The existence of trade connexions both by land and sea with the settlements in Baluchistan, Persia and Mesopotamia on the one hand and Kathia-

war and South India on the other, presupposes the existence of a large trading community at Mohenjodaro. As the emporium of trade, it must also have been reached by caravans from all parts of the Indus Valley. The cosmopolitan character of such a commercial city, which may be considered as a prototype of modern Karachi, explains why the skeletons found at Mohenjodaro have been composed of so many different races, whereas the skulls from different ancient cemeteries in Egypt point to almost an identical ethnic type. This heterogeneity of the population which may have been a source of strength in the flourishing period when every element attracted to the city by its wealth was absorbed may have later proved to be the cause of the disintegration of the civilization in its declining period. It is, however, a testimony to the general standards of equality that there was little in the exterior to distinguish the house of the commercial magnate or the ruling chief from that of the humble artisan or the ordinary citizen.

If the founders of Mohenjodaro originally came from the bleak and inhospitable wilds of Baluchistan, as seems likely, the physical environment and rich fertility of Sind must have exercised a very great appeal to them, particularly if Sind was then within the regular track of the monsoon. The cultivation of wheat and barley on an extensive scale in the Indus Valley must have been the principal foundation of the Indus civilization. Besides wheat and barley, it appears probable that rice, which is now the staple crop of the Larkana district was also cultivated and included in the dietary of the people. Besides cereals, fish and meat of most of the domestic animals known, namely, the cow, the pig and sheep, formed the daily food of these inhabitants, as can be deduced from the remains of bones of these animals in the streets and drains attached to houses. The flesh of the long mouthed crocodile or *Gharial*, tortoises, fresh fish from the Indus and dried fish from the maritime areas were also included in the dietary. As to other items, such as milk, vegetables and fruits, it has not been possible to obtain positive evidence, although there is little doubt that these were used, particularly as domestic cattle were abundant, and it can hardly be supposed that vegetables were not cultivated along with the cereals.

As regards clothing it is possible that common people used simple clothes made of cotton and richer people sometimes used embroidered ones. Some stuff like canvas must also have been known, as can be inferred from the impressions left on faience

seals. From a statue discovered among the ruins it appears that among the aristocratic classes an upper garment with embroidered trefoil decoration was worn like a shawl covering the left arm. It is probable, however, that ordinary people were naked to the waist and had only a lower garment as is the case with many parts of India to-day. The fact that most of the male figures in terracotta are shown entirely nude, while female figures are invariably clad, (except the bronze dancing girl), need not be taken to indicate that, as in Egypt, the majority of the inhabitants went about naked. The fashions of dressing the hair are manifold. The males probably wore their hair short and trimmed their beard but shaved the moustache. Another example of male hair-dressing is shown by a class of terracotta figurines where men are shown with long hair gathered up in a bunch behind and secured by a fillet. In most of the female figures we find a pan-shaped head gear, which may also be taken as a peculiar mode of hair dressing. The short skirts worn by women were held round the hip with a clasp or band, and the upper part of the body may have been left bare or occasionally a loose garment like a shawl may have been worn. As to the figure of the dancing girl referred to above, the features suggest that she belonged to a Negroid race of darker complexion than the Indus people, and it is possible that this class went about uncovered.

The love of bedecking the body with ornaments, to which the women of India have always shown considerable weakness, is amply illustrated by the variety and richness of the jewellery and beads found at Mohenjodaro and Harappa. Every known variety of semi-precious stone was pressed into service and all known metals, such as gold, silver, electrum, copper and bronze, besides faience shell and terracotta, were utilised for satisfying the needs of the different classes of people. Several hoards of jewellery placed in vessels of silver, copper and bronze have been discovered besides a number of isolated finds. The circumstances of the discovery of these hoards in most cases embedded either beneath the pavements of houses or carefully concealed below the walls indicate that the owners expected to return to their houses after the temporary danger, which necessitated their evacuation, had passed away. A very interesting find of jewellery was contained in a silver vase consisting of a fine necklace in which jadeite and gold beads were strung together in a long necklace with a number of agate and jasper pendants in the middle (Plate IV). The composition of this striking necklace is very artistic and speaks volumes for the high æsthetic sense of the people. Other important objects discovered

in this lot include a number of bracelets, rings with square bezels containing intricate rectilinear designs and perhaps the most important find of all, a number of rectangular and round flat silver pieces, the precursors of punch marked coins. Another noteworthy find was made in a large copper vessel covered by a copper dish on top, which was discovered on the floor of a house, which had been filled up with layers of unburnt brick probably at the time of evacuation of the city. This contained, besides gold pins, large silver ear rings and other ornaments, two fine girdles of carnelian beads. Each of these consists of six rows of barrel shaped beads of red carnelian separated from each other by bronze beads and spacers pierced with holes for the strings to pass through and semi-circular terminals at each end. The strings, of which some portion was still sticking at one end, were all gathered together at the end through the terminals. The girdles are over 3′ long and can be compared with those worn by some figurines in terracotta. The way in which the carnelian beads have been polished and perforated bespeaks great technical advance. The holes were drilled from both ends with great accuracy by means of copper and steatite drills and emery powder must have been used as abrasives.

Bracelets must have been rather common, one of the finest examples consisting of six strings of gold beads with semi-circular gold terminals at each end. A cone-shaped ornament at the crown of the forehead is reminiscent of similar ornaments used by married women from Marwar up to the present day (Plate IV). The use of fillets or head bands worn round the forehead or over the hair is inferred from the several statues and confirmed by a number of such finds. Usually they consisted of thin strips of gold about ½″ in width with and were sometimes as long as 16″. Ear rings and ear ornaments made of gold, silver and other metals are, though not common, easily inferred from their presence in the terracotta figurines. In some specimens, besides a stud usually of gold, there is a short tube of stud design intended to pass through the ear lobe and fitted into a smaller stud at the back. The use of a nose ornament is still a debateable point, as no such decoration is known from the terracotta figurines, and in fact does not appear to have begun in India before the Muhammaden, period. Certain faience discs with a cog-wheel border and a projecting stud are considered to have been used as nose ornaments by some scholars, but these have also probably to be looked upon as ear ornaments. Bangles have been manufactured in a variety of materials including gold, silver, copper, faience, shell and terracotta. Some of the gold and silver specimens have the hollows in the interior filled in with

a lac core. The poorer people must undoubtedly have used the terracotta bangles, but some of them are carefully finished and inscribed with pictographs. Except the bracelets made of faience, which are incised with decorative patterns, others show little ornamentation attempted on them.

The toilet of the women must have included the use of collyrium, face paint and other cosmetics. Small cockle shells, containing a red ochre rouge, copper needles or sticks for painting the eye and lumps of green earth discovered in the excavations, prove the use of such means employed by the fair sex for adding to their personal charm. Mirrors generally of bronze with raised edge for protecting the polished surface indicate their use probably by women of means. Combs of ivory (and also of other cheaper material) must have been used by both men and women, and several examples have been found.

The furniture in an average house of the Indus period must have included wooden beds like the modern *charpais,* stools of wickerwork and mats of reeds. The household vessels used for cooking, eating and drinking and for ceremonial use, were of earthenware but occasionally it appears that certain vessels for ceremonial use were manufactured also in conch shell and alabaster. A number of cognate objects, such as lids of vessels and caskets, spouted cups etc., in terracotta and alabaster are shown in rows (Plate V-a) indicating how forms were copied from one material to another. The vast quantity of plain pottery without any decoration found in the houses and drains indicates that the potter was one of the most important classes of craftsmen. In fact, one of the quarters found in Mohenjodaro has been considered by the excavators to be entirely inhabited by potters. The skill with which the miniature pottery has been manufactured, sometimes less than ½″ in height, is the admiration of the present day.

The usual means of locomotion must have been the bullock cart, which in Sind has not advanced beyond the type discovered at Mohenjodaro and Harappa. A large number of terracotta models of carts have been found, and complete models in bronze are also known. The latter show a gabled roof over the wooden frame work and must have been quite as comfortable as a large majority of the carts in use in rural India at the present day.

The large number of children's toys and requisites such as feeding cups discovered in different materials, such as pottery, shell and ivory, indicate the existence of a widespread toy industry and the care of the people to provide their children with these

amenities. The large number of pottery bulls and carts have been referred to above. Rattles in the shape of round balls with pellets inside generally decorated with painted lines are common. Quite a number of other animals, such as dogs, monkeys, birds, rhinoceroses, etc., are found. Some ingenious toys, such as bulls with a nodding head attached separately to the body, are known.

The use of playing dice which are referred to in the Rigveda and which play such an important part in later Indian mythology must be traced back to the Indus period. Several kinds of dice, both of terracotta and stone, have different numbers of circular incision on each of the six sides. Some ivory pieces, exactly similar to modern dice, are found but as they show the same numbers on all the sides, and contain either longitudinal lines or incised holes besides pictographs on them, they have been considered as divining bones. Quite a large number of pieces resembling modern chessmen made of clay and stone, some of them highly finished, have been discovered. It is, however, difficult to ascertain whether the game of chess is to be taken back to this early period. It has been considered by some scholars that these pieces are rather to be looked upon as *lingas* or phallic emblems. From certain bricks incised with rectangles in rows of four, it has been concluded that game-boards either in brick or other material were in use. Marbles of hard stone have been also discovered, but the specimens discovered are, in most cases, too good to have been used by children in ordinary play.

Hunting appears to have been one of the diversions of the town dwellers, as is apparent from some of the representations on the amulet seals and the remains of large antlers of deer and stags. The ibex heads seen hanging on either side of a *pipal* tree in a well-known seal show that this animal now rarely found on the Kirthar Range was then hunted. Some of the varieties of dogs found in terracotta indicate that hounds were used in chase. Bull fighting was apparently another of the pastimes indulged in by the Indus people, and in this respect a certain affinity with Cretan customs has been recently pointed out by scholars. Birds were either kept as pets or for fighting, as we find in a seal two jungle cocks depicted as engaged in a fight.

The large number of stone weights, generally of agate, very carefully finished and polished indicate their use in every household, probably in connection with the barter of commodities. The authority concerned with the maintenance of the proper standard must have exercised strict control over the matter, as the weights

issued were of a uniform type. From a study of the hundreds of specimens discovered, it has been found that the system was binary and decimal, inasmuch as the weights rise generally in multiples of two and occasionally of five, the aberrant weights being few and far between. The majority of the weights conform to two sizes, weighing about 13·5 and 27 grammes and were apparently used for weighing comparatively lighter articles such as precious metals, semi-precious stones, ivory, beads etc.

Besides dancing, it appears that music was cultivated among the Indus people, and it seems probable that the earliest stringed instruments and drums (with which to keep rhythm in accompaniment with the music), are to be traced to the Indus civilization. In one of the terracotta figures a kind of drum is to be seen hanging from the neck, and on two seals we find a precursor of the modern *mridanga* with skins at either end. Some of the pictographs appear to be representations of a crude stringed instrument, a prototype of the modern *bīnā*; while a pair of castanets, like the modern *karatāla* have also been found.

As to other fine arts, sculpture is represented by some very remarkable statuettes, notably the well-known limestone statue of a bearded nobleman clad in a shawl with trefoil embroidery (Plate V-c). There are besides a number of statues of composite figures and animals of somewhat indifferent workmanship. One of the small stone figurines from Harappa exhibits such a remarkable skill in delineating human anatomy that it is considered to be far in advance of the age in which it was produced. The seal cutter's art was very much advanced, and the figure of the bull reproduced on Sir John Marshall's volumes or Mohenjodaro stands as an eloquent testimony to the modelling skill of the Indus artist as also the existence of as remarkable a standard of animal husbandry as has ever been attained in this country. In terracotta and faience some of the model animals exhibit a very high standard of art, e.g., the faience monkey, squirrels and parrots, and some of the terracotta dogs and bulls. The other terracottas must be relegated to a lower standard of art, which, in this very common plastic material, could not have been confined to the very skilled craftsmen. It is in this material which has been in continuous use throughout the Indus and Gangetic valleys in all the periods that it is possible to trace the continuity of the Indus tradition in the historic period. Archæological evidence shows the continuity of artistic tradition, here obscure and there undoubted, from the days of the Indus culture to the historic period represented by

Mauryan terracotta found in Pataliputra. In spite of the vast changes that must have been brought about in other aspects of life during the interval between the ancient civilization of the Indus valley and the historic period, there seems to be an underlying unity responsible for the continuity of the life artistic, particularly in evidence in the clay-modeller's art.

There is very little evidence about the beginning of useful positive sciences, such as medicine, astronomy and mathematics. The finds of stag's horns and antlers and of cuttle bone known as 'seafoam' (*Samudra-phena*) raise the presumption that these ingredients formed part of the physician's repertoire. A black substance, which has been identified as Silajit (Skt. *Śilājatu*) and is still a favourite medicine in India for strengthening the action of the liver, appears to have been used by the Indus people. We can thus be sure that the germs of the Ayurvedic system of medicine are to be traced in the practical experience of the physician of the Indus cities. As for astronomy, the accuracy with which the houses were oriented indicates that the Indus people observed the movements of heavenly bodies and determined the correct cardinal points. Some scholars have taken a number of pictographic signs as indicating the different constellatory signs of the zodiac, but it is not possible at the present stage of our knowledge to accept these conclusions. It has also been suggested that the year of the Indus people was calculated as a solar year. This is not impossible, considering the regularity with which the floods of the Indus of such vital importance to the well-being of Sind recur annually, but in the absence of any regular evidence of the use of an era or a Cycle as in Egypt it is difficult to arrive at any definite conclusion.

It may be useful to recapitulate what classes of people inhabited the cities of this early age as demonstrated by the remains unearthed. Among the intellectual classes there were probably priests and physicians, astrologers and sorcerers. Of the fighting classes there are practically no vestiges, and one of the reasons for the destruction of this civilization may have been the inferiority of the Indus people in weapons of offence when confronted with a sturdier people. Among officials, there must have been Supervisors of the state and Municipal authorities, and the existence of a prosperous commercial and trading community can be well-nigh taken for granted. The other sections of the people, who formed the main bulk of the population, must have belonged to various arts, crafts and professions, such as cultivators and food distributors, fishermen and boatmen, water carriers, owners of caravans

of bullocks and herds of cattle, drivers of bullock carts, domestic servants and water carriers, workers in conch, alabaster and ivory, potters and terracotta artisans, gold, silver and copper smiths, masons and brick layers, stone and seal cutters and polishers. This tentative list indicates only such classes of people whose existence can be inferred from the remains that have come down to our times; while there must be other classes who have left no such traces behind them. We can compare with these the list of people referred to in the later Sanskrit works, such as the Rāmāyaṇa, in which the following classes are mentioned:—

Jewellers (maṇikāra); excellent potters; carpenters (sūtra-karmakṛit); those who live by the profession of arms; peacock sellers (māyuraka); wood cutters (krakachika); entertainers (rochaka); huntsmen (vedhaka); ivory workers (dantakāra); lime workers (sudhākāra); perfumers; goldsmiths; blanket makers (kambalakāra); attendants at bathing and clothing establishments (snāpakāchhādaka); physicians (vaidya); fumigators (dhūpaka); wine sellers (śauṇḍika); washermen (rajaka); weavers (tantuvāya) ; headmen and elders of villages; (ghosha and mahattara) ; actors (śailūsha) ; fishermen (kaivartaka).

LECTURE IV

Religion, Race, Funeral Customs and Animals.

One of the most surprising facts in the culture of the Indus valley is the paucity of what may be definitely taken as religious symbols or buildings definitely to be classed as pertaining to religion. If we consider that religion has always played a dominant part in all ancient cultures and how in India religion has moulded the lives of generations of inhabitants from the earliest times to the present day, it is unthinkable that it could have been otherwise in the case of the Indus people. How then can we account for this deficiency ? It appears that with their strong matter-of-fact outlook, the Indus people must have been comparatively free from the baneful influence of a strong priesthood as in Egypt or from the domination of priest kings as in the cities of Sumer.

With the upper classes the worship of the Mother Goddess, the goddess of fertility and crops, must have been the central point round which other religious practices and beliefs were interwoven. This deity is represented by figurines in terracotta and in an interesting seal from Harappa in which a tree is shown as issuing out of her womb. It is reasonable to suppose the representation of a goddess, which is found in more than one tablet, as standing in the bifurcated branch of a *pipal* tree, is identical with the same Mother Goddess. The worshipper in the latter case appears to bring a goat probably with a view to sacrifice, while a number of people in a row are standing in the lower register as if taking part in the sacrifice (Plate VI g). The sanctity of the *pipal* tree has descended to the present day, but its association with the Mother Goddess has not continued to the same extent. The sacrifice of animals, particularly goats, is the most characteristic feature of the worship of Śakti, and this appears to have been one of the most significant survivals from the Indus religion.

Another equally important deity is the prototype of Śiva, who can best be studied in a seal in which he appears as a figure seated cross-legged with the *penis erectus* and surrounded by the four typical animals of the Indus Valley, *viz.*, the elephant, tiger, buffalo and rhinoceros (Plate VI-d). The horned head-dress of the god is a feature which has not survived in later religion, but

the association with different animals is in keeping with the nature of Śiva as Bhūtanātha the lord of animals and Paśupati, king of beasts. In later Hindu mythology, the elephant has been appropriated as a vehicle by the god Indra, the chief Vedic diety and the buffalo by Yama, the god of death; while the tiger and rhinoceros seem to have dropped out of the Indian pantheon altogether. The tiger's skin is some times associated with Śiva, as also the skin of the elephant, but the animal by itself is not depicted in association with that god. The deer, which appears under the seat, is rather reminiscent of the Buddhist device connected with Buddha's first sermon at Sarnath. The humped bull, which stands alone in so many seals, must have been dedicated to one of the principal deities, and if the urus-bull with the protruding horn is to be associated with the goddess, as is likely from the fact that a pair of heads is attached to the *pipal* tree in a unique seal (Plate VI-a), it may be taken that the humped bull was dedicated to the prototype of Śiva. The association of the bull Nandi with Śiva is thus likely to have continued from the earliest times. On the analogy of the Ganges being associated with the crocodile (*Makara*) and Yamunā with the tortoise, the long headed *Gharial,* which is so common on Indus seals (cf. Plate VI-i) and usually represented with a fish in the mouth, may have been associated with the Indus as a river god or goddess—a cult which survives in Sind to the present day. A note on the animals known to the Indus people is attached at the end.

The worship of the god, who was the prototype of Śiva, cannot, however, be considered to have been iconic. A number of conical and cylindrical stones have been found, which suggest that the productive and fertilising powers of nature were symbolised in phallic representations. The worship of Śiva in modern times is almost invariably confined to the symbolic representation of the god in a Linga form, and it is very probable that a similar mode of worship was prevalent among the Indus people. A passage in the Rigveda is sometimes cited as indicating that the Vedic Aryans were familiar with phallus worshippers, of whom it is said "Let them not come to our sacrifice." It is possible that these were the survivors of the Linga worshippers of Mohenjodaro times, but the passage can also be interpreted as referring to people devoted to libertine practices among the Aryans themselves. Any way, it is clear that the Indus people believed in a god of fertility with whose worship the phallus was associated. A somewhat naturalistic phallus in terracotta meant to be placed vertically on a flat surface reminds one of the stone Lingam from Gudimallam. The modern

form of the *lingam,* with the Arghya or *Gauripaṭṭa,* in which the *lingam* is fixed, is suggested by certain ring stones, of which a number are found, particularly in a house at Mohenjodaro. Some scholars have taken these stone rings to be representations of the Mother Goddess in the same way as the phallus represented the supreme god (the prototype of Śiva). They do not, however, appear to have been so common as the *linga* stones, and it is possible that the single instance in which the rings have been found in a group may be explained as an instance of the employment of bases or pedestals of pillars. A faience tablet showing a seated deity flanked by worshippers on either side with a hooded cobra over the head, is reminiscent of the worship of Buddha by Nāgas as depicted at Sanchi and Bharhut.

The form of worship in which the common people seem to have taken part may have been that associated with the worship of trees identified with certain deities, and it is likely that animals like goats, bulls and buffaloes were sacrificed. Complex animals with the heads of different animals attached to a central boss may indicate an attempt to bring together the representations of the various deities. Fights between bulls and tigers, and composite animals which are represented in some of the seals, (Plate VI-b and c) have been taken to indicate connections with Sumerian and Cretan religious practices. These, however, may be attributed to such elements of the population as had cultural affinities with these centres and need not be considered as typical of the Indus valley.

Some scholars have proposed that among the survivals of the Indus culture must be considered human sacrifices and the adoption of priests for magical rites. There is no evidence of the former practice in the excavations, but it is likely that the difference between the religious ideas of the Rig Veda and those of the Yajur-Veda and Atharva-Veda, where we find the belief in a number of spirits impersonating trees, etc., and magical practices to annihilate enemies and demons, is probably to be accounted for by the infusion of the Indus priesthood, but the extent to which the Indus religion permeated the religion of the Aryans as found in the Vedas may be exaggerated. It is undoubted that Agni and Indra, the two most prominent deities in the Rig Veda, appear to have been totally unknown to the Indus civilization. What seems to have happened after the blending of the indigenous civilization with that of the Aryans is that the survivals of the Indus culture were mostly incorporated in the lower two divisions of Indian

society to which as craftsmen, traders and cultivators they approximated. The worship of the Mother Goddess in terracotta figurines thus continued to be the main visible link between the Indus culture and the Gangetic culture of historical date. The Brahmans and the Kshatriyas, however, continued to dominate the field of religion.

The skeletons discovered at Mohenjodaro and Harappa have been examined by anthropologists and prove to belong to heterogeneous races. Mohenjodaro in particular appears to have been as cosmopolitan a city as, for instance, Karachi or Bombay, which is not quite unexpected in a place which had a large floating population owing to its commercial character. In a country like India with its flank open to the intrusion of other races and with the interior of the country occupied from immemorial times by races in lower stages of development, racial purity cannot be expected, and the fusion of different ethnic elements must have been the rule from the earliest times. As will be apparent from a glance at the types of skulls found at Mohenjodaro the main stock of people there consisted of the members of the dolichocephalic or long-headed race which had affinities with the people of the Mediterranean. The Austro-Asiatic element in the population can be accounted for by trading connections with the people of the west coast and the south of India where very important materials, such as, carnelian, amazonite, conch shell, etc., were obtained. The slight Mongolian element may be accounted for by the gradual infiltration from the north-east in which direction India does not possess any impregnable land frontier. The brachycephalic or broad-headed strain must be accounted for by the intrusion of sturdy Alpine people from the Central Asiatic highlands, who have from time to time imposed their dominance on the inhabitants of the plains of north-west India.

The funerary customs of the Indus people are yet obscure, and it is unfortunate that the elaborate provision for the after-life made by the ancient contemporaries of the Indus people in countries like Egypt and Sumer, which have yielded such a rich harvest to the archaeologist, did not find a counterpart among them. At Mohenjodaro no trace of a cemetery or burial place has been discovered, and it is strange that if the people responsible for this civilization had adopted some customs of burial, they should not have been revealed in the course of such investigation. The find of the common pointed goblets or drinking vessels with ashes, bone and charcoal under the floors of houses or in the lanes, indi-

cates the existence of the system of cremation and the burial of a few bones in the vicinity of the houses. It is possible that the dead were cremated at some distance from the town, preferably on the banks of a river, as among the modern Hindus, and some of the ashes and bones were collected for some funeral rites, a practice which also persists in the present day. It is quite in keeping with the practical nature of the Indus people that they had no illusions about an after-life based on the mortal remains, and in this respect they seem to have been far ahead of the more or less primitive beliefs of other ancient people. If the funereal mound or tumulus, the prototype of the Buddhist Stupa, had ever existed among the Indus people, it should have been preserved near the ancient cities of Harappa ond Mohenjodaro, and we may reasonably conclude that this feature, at any rate, was not derived from the Indus people.

In the vicinity of the mounds of Harappa a cemetery has been brought to light almost by an accident in the plain level ground. (Plate II-b). The remains brought to light are too meagre to be considered as typical of the main body of the population, and must, therefore, be regarded as pertaining to a small section of the citizens of Harappa. They fall in two categories referrable to an earlier and a later strata of occupation. As we know that the racial elements, of which the population was composed, were manifold and probably varied from period to period, it is possible to assume that the complete and fractional burials discovered at Harappa were typical of distinct classes of people. The lower stratum of burials shows several examples of complete inhumation, in which the body was laid generally with hands turned up and the knees bent, surrounded by a quantity of pottery, jars, cups, dishes and bowls. This method of burial is also parallelled at the site of Nal in Baluchistan where several examples were discovered and may be taken to indicate a community of racial strain. The polychrome pottery associated with the dead at Nal, is, however, so typical in its technique and design that it is difficult to formulate any definite conclusions.

By far the largest number of examples of burials found in the Indus cities is in the upper stratum of the Harappa cemetery, where over a hundred jars, containing skulls and bones, constitute a system of fractional burials. One burial of this type has been discovered in the main mound at Harappa, where it has been assigned to the late period of the city's existence. The two skulls

found in this burial belong to a broad-headed northern racial type. Another group of 15 skulls found in another part of the city was accompanied by a number of human and animal bones, offering stands and pointed vessels but without any containing jars. In the latter case they are considered to be the remains of victims rather than examples of regular orderly burials. The large number of jar burials found in the open ground are apparently of a later date and from the fact that the skulls and bones found in them show no signs of being burnt it has been suggested that the bodies were exposed to the birds of the air and the bones collected later on for inhumation. If this view is correct, then we have here a link with the burial customs of the Parsis, but the other circumstances do not square up with the supposition that a cognate people were inhabiting the Indus cities. The pottery associated with the funereal remains at Harappa is of a distinct type, which cannot be parallelled with examples from the ordinary pottery in use in the Indus cities. The decorations, vegetable patterns and in particular the animal representations, are peculiar, and the forms of the vessels are also unlike those represented in the pottery in regular daily use. Attention may be drawn to certain animal designs representing composite animals, deer with long horns and antlers, and peacocks. The presence of peacocks on these funerary vessels indicates that they were in some way connected with the ideas of the after-life and in some cases are supposed to have carried away the souls of the dead.

The existing meagre evidence in regard to the funeral customs of the Indus people points to the conclusion that, while cremation (together with the practice of burying a few bones after cremation in an urn or jar) was the main method of disposal of the dead, other customs indicating complete and fractional burials were also known and probably prevailed among some classes of population that may have immigrated at a later date from Persia and Baluchistan.

NOTE ON THE ANIMALS KNOWN TO THE ANCIENT INDUS PEOPLE

The life of man in the earlier stages of his civilization depended upon his ability to control and utilise for his purpose the lower animals. Apparently the main difference between the earlier inhabitants of India who dwelt in the forest-clad hills and plateaus, who had not passed beyond the hunting stage, and the more civilised inhabitants of the Indus Valley with whom we are dealing, is

their skill in domesticating animals. It can then be presumed that these earliest civilised people of India had already domesticated the two varieties of cattle, humped and without hump. Taking the humped bull first, although it is believed by some to be of Libyan origin, and is also met with as a sacred plough animal among the Sumerians and Kassites in Iraq and also found as a necklaced bull on proto-Elamite seals, it must be considered as autochthonous in India. The other variety of cattle, namely, (*bos taurus*), which is the parent of the modern European cattle and is found so largely on Sumerian seals, was also well-known in India. At present the only place in India where these are to be seen is probably the Nilgiris where European cattle were introduced a few years ago. The bull being the most useful animal for agricultural purposes, it is no wonder that, as time passed on, it began to partake of a sacred character, particularly among the cultivators. Neither in Mohenjodaro nor in the early Vedic times was it, however, tabooed as food to the people of India.

The buffalo of the Indus Valley is believed by Zoologists to be a descendant of the Pliocene buffalo that loved to haunt the shady puddles of semi-tropical climates, and India was a principal, if not the main, centre of its domestication. To the early Sumerians this animal was well-known, being found on a seal of Sargon I about 2,800 B. C. Occurring but seldom on the seals from Mohenjodaro, it is known from some beautiful toy models in copper and terracotta. Its comparative scarcity in modern Sind is undoubtedly due to the severity and length of the summers which do not agree with the habits of this animal.

The elephant is another animal particularly associated with India since times immemorial. Though now confined to the extreme East and South of India in its wild state, at one time it must have been found further to the North and West. These elephants were such an unknown factor to the Greeks that they are known to have puzzled Alexander and proved as the decisive factor in several battles to his Seleucidan successors. Ivory formed one of the products of India taken by King Solomon's ships and was undoubtedly an article of commerce between India and Sumer. Besides hundreds of objects made in ivory including legs of tiny furniture, dice, fish, combs, plaques, etc., a whole tusk of ivory has been found at Mohenjodaro. The drawings of the animals on the seals, however, do not bear any comparison with those of the Brahmani bulls, in the delineation of which the artist of Mohenjodaro has shown himself far ahead of his contemporaries.

The camel whose bones have been found, is also believed to be a descendant of the Siwalik camel which roamed about in the tertiary period along with the ancestor of the Indian humped cattle (*Bos indicus*). The paucity of camel remains and the absence of any glyptic representations emphasise the hypothesis that the climate of Sind was not then (unlike now) particularly congenial to this animal.

The dog has the best reputation all over the world as the companion of man, and it is not surprising that this animal was domesticated before the establishment of the Indus cities. Footprints of dogs have been traced on many bricks, which must have been exposed for drying before they were burnt in the kilns. A number of terracotta representations have revealed the fact that of the two main classes of dog, one was akin to the pariah dog so common in the Indian villages, while the other was of the grey-hound type that probably found favour with the hunting and nomadic classes. There is also the mastiff almost like a bull-dog. Some bones from Harappa have been pronounced by Zoologists to be of the latter type, and Dr. B. Prasad's study of these has led him to the opinion that the origin of this type must be traced to the Indian wolf from its affinities. The pariah dog on the other hand has greater affinities with the Indian jackal. The breed of Indian dog must have been famous in the most ancient days, as Indian dogs are known to have been exported to Babylon.

The donkey was undoubtedly known to the Indus Valley people, and a few bones from Harappa testify to this. It is, however, very doubtful whether, as in contemporary Sumer, the donkey was the main beast of burden. In historic as well as prehistoric India, the bullock was the main pack animal, and the caravans which must have conveyed the trade between the various centres of this civilization consisted only of bullocks. Even after the introduction of the horse the draught animals of India never probably included the donkey but the mule. A few horse bones found at Mohenjodaro are apparently to be relegated to the latest period, and on the general evidence we have to suppose that the Indus people were not acquainted with the horse. Whatever that be, the curious name given to what may be considered as the most important religious tree of India, namely, *Aśvattha* (*Ficus Religiosa*) strikingly illustrates the fact that the Sanskritic people, when they first saw the tree, found the most appropriate use of it as 'stands for their horses.'

Clay figures of the horned ram are rarely found, but there are several faience and other figures. The design of the Sind *Ibex* or wild goat is so common on painted pottery discovered from the Indus valley to Sumer that it has been used as an argument for cultural affinities in this wide-spread area. The tame goats of the Indus Valley whose bones have been discovered at Harappa, are probably derived from the wild stock of the ibex. It is in the Kirthar hills to the west of Indus that the Persian *Ibex* meèts the Markhor, now so common in Kashmir.

A few bones of cats have been found at Harappa, but on the whole this animal whose original habitat is Ethiopia, and which is so prominent in Egyptian mythology, was not common in India. The pig, of which a very large number of teeth and some bones were found in Mohenjodaro, must have been found both in the domesticated as well as the wild state as in modern times. Apparently its meat was relished by the Indus people, and the animal may also have served as in modern Indian towns to supplement the scavenging system.

Monkeys appear to have been as common as in modern India. The fine faience figure of a monkey shows intimate acquaintance with the animal and its resemblance to human beings, which was used to provide material for so many Jātaka and other stories in Indian folklore. Among wild animals, the tiger and rhinoceros, which must have long ago deserted the desiccated Indus Valley for the well-watered regions of Central and particularly Eastern India, were well-known to the Indus people and seem to have occupied some place in their religious beliefs. The tiger hunt seems to have had some ceremonial significance from its methodical appearance on seals, and the elephant, tiger and rhinoceros together with the *gharial,* which recur on several prism-shaped terracotta impressions, formed a sequence which must have had a prophylactic significance.

Just as the wild elephant, tiger and rhinoceros were the main dangers which the Indus man had to encounter in the forest, the great Indian long-mouthed crocodile known as Gharial must have been the main beast of the river known to the Indus people. Unlike the denizens of the jungle, this aquatic animal continues to haunt its original habitat of 5,000 years ago, its physical environment confining it, as in a cage, to the middle basins of the Ganges, Indus and Mahanadi systems. A few bones of this animal have been discovered at Mohenjodaro.

The Kashmir stag and the Sambhar deer as also the hog deer and spotted deer are represented in the Zoology of Mohenjodaro by several specimens of their horns and antlers. It is very likely that these animals were hunted for these very parts which were considered as valuable. It seems that as in the later Ayurvedic system of medicine, these early Indians prized the antlers for their medicinal properties. It is likely that the pharmacopoeial recipes of the Indus people included some of the queer formula found in the old Indian medicine such as the bile of a cat or the heart of a peacock, but in the absence of any direct evidence the subject cannot be pursued further.

Among the smaller animals we find the mongoose whose natural antipathy for the snake finds an important background for several folktales. The squirrel and the parrot are known from some exquisite little models in faience. Both these are the usually noticed features of the present day landscape in Sind. The domestic fowl is very common among the small terracotta toys and is also common in pictographs. The peacock is observed in animal designs with which the painted pottery, particularly of the funerary variety found at Harappa, is embellished. Terracotta and shell models of turtles corroborate the finds of bones from Mohenjodaro. The hare is known from a pottery model and from several representations on the copper tablets. On the whole the repertoire of animals and of Indian animal life is more complete in Mohenjodaro than what is revealed by excavations on historical sites in India.

LECTURE V

The writing of the Indus period

The most characteristic and fascinating feature of the Indus civilization is the writing, which has tempted several scholars to attempt the task of deciphering. As the key to the unravelling of the nature of the civilization will depend upon this decipherment, the challenge offered by the still undeciphered script to the intelligence and ingenuity of scholars has been irresistible. It is, however, a very difficult task in the absence of a real clue to convince other scholars of the validity of the hypothesis from which the decipherer has to start. For the present the utmost that can be attempted is to make an objective study of the material supplied by the writing and to place the tentative conclusions before the world of scholars. In this respect Dr. Hunter's work appears to be the most reasonable statement of the problem at the present stage.

By far the largest amount of material on which the writing of Indus period has been handed down to us, consists of stamped seals invariably made of steatite generally coated with a glaze. These seals have been also called seal amulets, as it is believed that they were carried by the citizens on their body by means of strings passed through the holes perforated either in a small boss at the back as in the case of square seals or through the seal itself as in the case of the small rectangular seals (Plate VI-f). The most likely source of the steatite is from the outcrop in the Aravalli hills in the South Rajputana, where steatite of similar texture without layers or laminae has been reported. The material appears to have been cut into shape with a saw and finished with a chisel or drill. In the course of the finishing process the seal appears to have been fired with a coating of calcium on it and the final product was glossy white, quite different in appearance from the original steatite. A number of small tablets of steatite from Harappa containing an almost identical legend have been considered by Hunter as receipts. A number of cubic seals of yellow paste marked with the Swastika and other markings and legend on one or two sides appear to have some special significance, perhaps religious. Only two examples of cylindrical seals are known, which indicate that this form, so universal in Sumer, was very seldom adopted in India. There are a number of square copper tablets

with animal device above and inscription below, which have been considered as coins but may also be considered as amulets.

The commonest animal device found on the seals is that of an animal resembling a bull but with a narrow muzzle without hump and one protruding horn shown in the profile. In front of the animal is placed the conventional tree surmounted by a stand of basket work. The persistency with which this motif occurs, seems to indicate that both the animal (which is unlike any known animal and with the single horn must be considered as imaginary) and the objects had a ceremonial significance, connected with the principal deity worshipped at Mohenjodaro, which it is only possible to understand when the script has been deciphered. There are a variety of other animals depicted on seals, which include the long horned humped bull, the buffalo, the bison, the elephant, the tiger, the rhinoceros and the *gharial.* (Plate VI-a). In most of the seals on which these animals have been depicted, there appears a trough or manger before the animal. In a few cases we also see composite animals partaking of the characteristics of elephants, bulls and goats. In a circular-shaped seal, we find six animal heads radiating from a central boss (Plate VI-a) and in another a three headed beast has been shown. A few seals of religious significance including the unique *pipal* tree and the seated God have been referred to elsewhere. On the copper seals or tablets we find the hare, the elephant, the goat, the deer or antelope and the two-headed animal, whose heads spring from opposite ends of the body. Inscriptions have also been found on pottery, drinking cups, terracotta bangles, gold ornaments and ivory pencils. A number of burnt clay tablets, circular, rectangular or triangular (cf. Plate VI-i & j), have been found, but there are practically no impressions from the regular square seal with the unicorn, of which such a large number have been recovered.

The use to which such seals or seal amulets were put in other ancient countries, suggests that they were stamped on some plastic material like clay so as to authenticate property or secure the mouths of jars or closed doors. Owing, perhaps, to the fragile nature of these clay impressions, not many specimens of this kind have been found, but in one instance, at any rate, a lump of clay found in Mohenjodaro showed the impression on one side of a large-sized unicorn seal and on the other that of reeds bound together by a string, which indicated that the particular sealing may have been attached to a box made of reeds or perhaps a door made of the same material. (Plate VI-h & k). The terracotta

sealings appear to have been used for some specific purposes as they do not seem to have been attached to documents as in the historical period, where a study of the back of such sealings, in some cases, reveals the objects against which they were affixed. It is, however, undoubted that the inhabitants of Mohenjo-daro attached a very great importance to these seals, and probably every citizen carried one on his person. In some instances it is found that the legend above the animal has been cut, and an attempt to replace it by another legend has been made, which may indicate that after the death of the person, who originally had the seal engraved, it was reappropriated for use by another.

The Indus writing has been characterised as pictographic, but it is obvious that, except for a small number of signs, showing the pictures of birds, fish etc., and others indicating varieties of the human form, the rest have a more or less conventional character. A remarkable feature of the Indus writing is its clarity and straight rectilinear character. The direction of the writing as inferred from the recurrence of certain characters and other indications has been found to be from right to left, though some inscriptions do appear to have been written from left to right as well. Legends in two or more lines have been found to be boustrophedon or alternately from right to left and from left to right. There are no marked variations in the form of the letters except when the nature of the material, such as terracotta or ivory, made a cursive form inevitable. The earlier stages through which most of the signs may have passed, in their evolution from the pictographic to the ideographic or phonetical stage cannot be traced, as no early or later modifications of the writing have been found. If we compare this feature with the modifications which the Brāhmī script underwent from century to century and from region to region in the historical period, the static character of the Indus script would almost be considered phenomenal. If this ancient script is to be considered as the parent of the historical Brāhmī, it is strange that its vicissitudes and peregrinations during the twenty or more intervening centuries should have left little trace on it and the more or less rectangular character of the writing should have remained unaffected. If we compare the stages through which the Egyptian hieroglyphics passed from very faint beginnings in the pre-dynastic age to the Ptolemic epoch when the co-existence of the alphabetic variety of the ancient script with Greek writing furnished the clue for its decipherment, it seems an inexplicable phenomenon that in India there should have been a complete blank for some 2000 years.

The undoubted resemblance between a number of Indus signs on the one hand and the Sumerian and proto-Elamite signs on the other, presages a close connection at least in the formative stages. A certain amount of analogy can also be found between Indian and Egyptian pictographs on the one hand and Indian and Chinese pictographs on the other, particularly in the symbols representative of man. Apart, however, from the superficial resemblances, it is undoubted that the Indian script was developed independently on Indian soil and probably more or less adapted to the requirements of the language. The connections which have been found by scholars between the Indus script and the Brahmi alphabet or the Indus and the south Semitic scripts may for the time being be considered as fortuitous. A remarkable analogy between the Indus script and the writing found on the Easter island wooden tablets of a comparatively late date is also of no consequence whatsoever, so far as the study and decipherment of the Indus script is concerned. The only direction in which we can expect real progress to be made in the future is that with more extended excavations in Mesopotamian sites and perhaps also in India some bilingual records may furnish undisputable links. Such a find is not entirely beyond the range of possibility, inasmuch as there is a growing volume of evidence that Indian traders went forth to different cities of Sumer carrying with them such personal seals. Dr. Langdon has attempted to read the name on one Indian seal from Ur written in the Sumerian script as either Sak-ku-shi or Ka-lu-shi or Ka-ku-wa. This may, at best only give us the name of some Indian trader, but unless such a seal also contained Indus writing, it cannot lead to any progress in the decipherment of this script.

In the attempt to decipher the script, several scholars have taken for granted the identity of the Indus language with one or the other of the known languages or their proto-types. Thus, while one scholar considers it identical with the Sumerian language, another has taken his stand on the proto-Dravidian or the parent language of the modern Dravidian tongues of the South. Some scholars have even found Sanskrit formulae in the writing on the seals. The most satisfactory analysis, however, so far made is that by Dr. Hunter. Even for the most careful scholar it is possible to follow a majority of the conclusions, reached in his work 'on the script of Harappa and Mohenjodaro'. The signs, which are over 230, apart from the compounds or slight modifications, have been arranged in 100 tables in which symbols of the same character have been grouped together. The com-

monest Indus sign is a U-shaped sign with two strokes on either side at the upper ends. A large majority of instances of this sign occur at the left end of the inscription, which can be considered to be the end if the direction of the writing was from right to left. Allied with this sign are several others in which slight modifications, such as a vertical stroke in the centre or two or three vertical strokes, have also been found and may be considered as some modifications with vowels. It has been reasonably concluded that the sign is either a determinative or a suffix. Even when the sign has been found in the middle of an inscription, it is usually preceded by the same signs as occur when it completes an inscription, which shows that the sense of the word or phrase is complete with these particular signs. Some of the signs, such as an oval or rhombus, with a small compartment at the top, on the other hand almost always occur in the beginning of the legends, and must, therefore, be considered as determinatives or honorific titles at the beginning. In a great many instances, these latter signs are again followed by two short lines which must also have a significance of a case-ending or a vowel. A large number of the Indus signs consist of one or more short lines, which are grouped together as the numerical symbols in most of the syllabaries. The short strokes occur only in groups of 1 to 12, mostly vertical or rarely transverse. The longer strokes are 1 to 5. A symbol consisting of one straight and another oblique stroke is also common, while others are shaped like brackets and arrows. A ⊓-shaped sign is the base of some 10 different symbols, the commonest in the group being one with two strokes attached on each of the three sides and an arrow at the open bottom. This sign is similar to a Sumerian pictograph and is likely to have the significance of a store or granary. The human signs are over 20 and include a man standing, walking, holding the bow and arrow with arms upraised, carrying a jar or holding a staff. One important figure shows a man carrying on his shoulder pitchers of water hanging from a pole. This sign is sometimes joined together to the commonest U-shaped sign of jar. One group of symbols consists of rectangles divided into a number of compartments by horizontal and vertical lines. We can see in these the representations of houses with 2, 3, 4, 5, 6, 8, 9, 10, 12, 14, 15, 18 or even 21 compartments.

Among zoomorphic signs, the commonest is the fish sign, which is often modified by strokes on the body or an angular adjunct at the top. A dog, a fowl, a duck in a pool, a goose, and a bee and one or two other insects constitute the animal forms. A Y-shaped figure with the central vertical line extended at the top is probably

to be taken as a tree symbol and the *pipal* leaf is imitated in another pictograph. A number of triangles in a row are found in this as in other systems of pictographs, perhaps also indicating a mountain or ideographically, other countries separated by ranges of hills. Tables and chairs have been recognised in two pictographs, and cross-roads are indicated by double lines crossing each other transversely. The symbol closely resembling the caste mark of the Vaishnavas in the south is known in the Mohenjodaro pictographs. An E-shaped pictograph with more than three prongs has been ingenuously explained by Hunter as indicating the suffix "from" owing to its occurrence on a class of inscriptions from Harappa.

Several scholars have attempted to explain the marks such as four dots sometimes found enclosing other symbols or the angular mark sometimes attached to the fish symbol as indicative of a vowel system, the precursors of the vowel inflections in the historical Brahmi script. It is, however, unlikely that these so-called vowel modifications should have been affixed or prefixed to a few symbols only and not to others. The persistent concomitance of certain signs can, however, be considered as a sure sign that they formed words or phrases of definite import in the original tongue. When it has been possible to ascertain the actual nature of the script, new light will be thrown on all the other aspects of the Indus Valley culture, and every aspect of the remains such as buildings, pottery, religion, art etc., will reveal a new meaning in the light of the written records.

Among the human signs one is considered by Hunter to denote 'a slave' from the fact that in some texts one of the component signs formed the subject matter of a receipt and is connected with the Egyptian determinative 'slave'. Hunter finds it difficult to think of any other commodity which could be at once the subject of a receipt and qualified by the determinative 'slave'. There is every possibility that the various combinations of the human signs with different objects, such as a stick or a U-shaped vessel or a shield or a fetter on the leg, should be considered as idiograms for words in the original language denoting different vocations, etc., such as a water carrier, washermen, soldier, prisoner and so on. All signs in the Indus script however, are not so akin to the original pictures from which they were derived, and a long period of development must be taken for granted before a large majority of the signs with their geometric shapes were evolved.

It is impossible to give any detailed account of the legends or signs or throw helpful suggestions for the decipherment of the

script at the present stage. The material at our disposal is sufficiently large, but in spite of the exhaustive study devoted to the subject by different scholars, no real light can be thrown on the subject for the benefit of the ordinary student. Any line of reasoning which may appeal to one scholar or set of scholars does not commend itself to others, and unless a real key, which can be worked by any and every investigator, is found, it is likely to remain a fruitless endeavour.

LECTURE VI

Pottery, metals, chronology and other considerations.

The most abundant material left by the Indus Valley people consists of pottery which has always been considered as the firm foundation of archæology. Except in rare cases, the pottery is generally manufactured on the site and gives a local touch to the life of the period; whereas other remains of civilization are liable to be taken away by invaders or rifled by treasure hunters of later date, pottery fragments generally remain where they are, proving safe and sure indicators of their makers. This is true not only of Indus Valley sites but of all other sites in India and elsewhere. The preponderance of pottery in ancient sites often makes one think as if the inhabitants did nothing else all the time than to make and break their pottery. In Egypt, thanks to the efforts of Sir Flinders Petrie and other archæologists, the study of the types of pottery belonging to the different ages and periods has been reduced to the level of an exact science, and the formulation of a scheme of sequence based on pottery has been of inestimable value to persons engaged in research in that country. In India the technique and morphology of pottery found in the various excavated sites has not yet been studied to that extent, nor was it of such paramount importance in the historical period, where it was possible to fix the periods by reference to bricks, sculptures and inscriptions. In the Indus cities the types, shapes and sizes of all kinds of pottery have been carefully noted and published, but, in the absence of remains referrable to epochs intermediate between the pre-historic and the historic periods, it is difficult to prepare a complete corpus for the pottery of this vast country with a degree of success.

The pottery from the two city sites of the Indus period differs so little from each other that it is impossible to distinguish any local variation in type or ornament. The material was the alluvium from the Indus which was full of particles of sand. Most of the specimens of pottery were wheel-turned, only a very small number being hand made. The kilns in which the pottery and also the bricks and terracotta were fired, are known from some specimens and appear to be circular in shape with arrangements for heating underneath a floor provided with flues. A vast majority of the vessels consist of well burnt vessels to which red slip made from ochre has been applied, which must have been brought then,

as at the present day, from the island of Ormuz. The surface finish in most cases is very fine and must have been due to polishing with a burnisher. The miniature vessels, some of which are less than ½″ in height, are in particular so beautifully finished as to excite the admiration of the present day visitors.

The pottery of Mohenjodaro exhibits as many shapes and sizes as it is possible to conceive of for daily practical use. It is, however, significant that very little handled pottery has been found, although both in Egypt and Babylonia such vessels were common in the earlier periods. The commonest type of drinking vessel had a knob or point at the bottom, which shows that after use the vessel was emptied and placed on the ground with the mouth downwards. Other wares show a flat base and high cylindrical body. Many types of beakers, vases, bowls, goblets, dishes, basins, storage jars are known. Offering stands, sometimes as high as 2′ with a cylindrical body and a broad dish at the top, are peculiar to the Indus sites. Their use for ritual purposes can be established on the analogy of finds in Mesopotamia.

Painted pottery is comparatively less common in the Indus Valley, but the technique and designs found in the pottery of Mohenjodaro and Harappa are so distinctive that they offer one of the best means of distinguishing sites of this period from those of the historical period. Only one complete specimen of a painted vase has been found at Mohenjodaro, (Plate V b) and the designs on it comprise a series of interesecting circles, which was the most popular pattern of the Indus period. Other common designs are tree and leaf motifs, chess-board patterns formed of squares, hatched triangles, and combs. Among the animal designs, which are less common, may be mentioned birds, snakes, fish, ibex and deer. The occurrence of the ibex in other sites of the Indus Valley, besides Mohenjodaro, has furnished evidence of contact with sites further West.

It is noteworthy that the human figure does not occur among the designs on the painted pottery of the Indus Valley, nor can any parts of the human body be traced except perhaps the oval shaped device which may be the eye. The contemporary pottery of Sumer, Elam and Egypt does, however, contain human figures, and its absence in the Indus Valley is significant.

The smaller sites in the Indus Valley explored by Mr. N. G. Majumdar have yielded considerable ceramic remains, which indicate a community of culture between the hillmen, the inhabitants

of the area around the Manchar lake and the citizens of Mohenjodaro and Harappa. The most important class of pottery that is common to all the sites and has also been found in the sites explored in Baluchistan by Sir Aurel Stein is the pottery ware with decorations in black on polished red ground. At certain places, notably at Amri on the Indus, a class of thin pottery showing black or chocolate designs painted on a matt surface has been found, while at Nal in Baluchistan a different variety of pottery somewhat akin to the Amri ware but having a distinctive tendency to geometric designs in three colours is predominant. A still different strain can be observed in the finds from certain other sites, such as Jhangar, and also in the latest levels of Mohenjodaro, where the black on red ware was replaced by incised black pottery.

One of the curious types of pottery found in Mohenjodaro is what is known as the knobbed ware in which rows of knobs are placed on the surface to decorate the middle portion of the vase. The importance attached to this ware is considerable, inasmuch as similar specimens have been found in the excavations at Tel Asmar in upper Iraq, which has furnished one of the links between the two countries and an indication of the age of the Indus Valley sites.

The use of metals seems to have been fairly common in the Indus Valley, and the most abundant metal is copper, along with which must be classed bronze. It has all along been assumed that copper preceded the use of bronze, but so far as the Indus Valley is concerned it is clear that from the earliest period the inhabitants of these cities knew the use of a compound of tin and copper in proportions which must be considered as bronze. Some of the specimens from Mohenjodaro contain too excessive a proportion of tin to yield the necessary amount of hardness. The sources of tin being somewhat far away from the Indus Valley, it seems more likely that the Indus cities obtained their supplies ready made from some distant source, which did not leave them the option to produce the exact proportion. Copper itself may have come either from the mines in the neighbourhood of Khetri in Jaipur or from some old workings in the Udaipur State from which the supplies of steatite were also obtained. Baluchistan is also another probable source of copper, and two other localities, namely, Oman in Arabia and Singbhum (where the mines are still used) have also been suggested on account of the appreciable amount of nickel, which is found in the products of their mines and is also detected in the analysis of the Indus Valley specimens. It is very likely that the copper ore was smelted at Mohenjodaro as is proved by the discovery of a quantity of ore and ingots in the excavations.

It is from the use of copper for the bulk of necessary implements that the name chalcolithic, which is generally used to denote the stage of human civilization reached by the Indus Valley people, is derived. The other part of the compound indicates the use of stone, but except scrapers of the ribbon flake variety and the cores of chert from which these were chipped off, there are few other examples of stone implements. The continued use of stone scrapers (which may indicate a survival from a far earlier neolithic stage, adopted owing to its convenience or for some ritual significance) does not warrant the assumption of a chalcolithic or 'copper stone' age. It will perhaps be more appropriate to call this as the copper age in contrast with the later iron age. The proper correlations of the copper with the iron age cannot be or have not been traced in India as in Egypt or Babylon. In North India, the age of copper seems to have given place to iron in some indefinite age, while in South India the stone age was supervened by the iron age without any intervening stage that can be called the copper age. Perhaps the difficulty of obtaining copper must have prevented the aboriginal inhabitants of Southern India from taking advantage of the advances in metallurgy which the Indus Valley inhabitants were utilising, and when the art of smelting iron was once introduced, the ubiquitous supply of the ore throughout the South made a tremendous change in the habits of the people still in the neolithic stage.

A large number of utensils made of copper or bronze have been discovered in the Indus Valley sites. They are of various shapes and sizes, being mostly vases, (Cf. Plate VII) cups,, jars, basins and dishes, sometimes provided with lids. The survival of copper as the proper material for sacrificial vessels in the Vedic civilization, which idea persists to the present day, is an indication of the fact that the Vedic people arrived in the Indus Valley in the same stage as the Indus civilization. As compared with Mohenjodaro the site of Chanhudaro has recently yielded a large quantity of copper utensils and implements.

Among the tools and implements found at Harappa and Mohenjodaro, lance heads, chisels, celts, axe-adzes and saws account for a large majority (Cf. Plate VII). The spear blades are somewhat thin and large and were apparently provided with a mid-rib of wood to strengthen it, but are on the whole very weak instruments of offence or defence. Axes are either long and narrow or short and broad, the latter being probably used for cutting wood and the former as adzes. Only one example

of a socketted bronze adze-axe is known, which is remarkable for its technical advance and is comparable to some finds in the Caucasus region. Razors of three or four types are known, the commonest being one with a semi-circular edge with a long handle. Another kind is L-shaped, but rare types consisting of a long straight blade or with a bent handle terminating in a bird's head are also known.

Daggers, knives, together with two rare specimens of swords are the only weapons known from the Indus Valley. The daggers and knives are generally long and leaf shaped, (Plate VII) some having one edge and others with two edges. The swords are among the most exceptional specimens of this period. They are considerably thickened in the middle, but their blunt points would appear to prove that they were not used for thrusting an enemy. The arrow heads are thin pieces with points, and it is probable that it is more to this missile that the Mohenjodaro people resorted for their defence rather than to swords or other weapons.

The most interesting weapon among the workmen's tools is the saw, of which some specimens are known. Its cutting edge is semi-circular in shape and the toothed edge is wavy. It was very likely used for cutting conch shell, which was required in various sections by the people. Among the conch workers of Bengal a similar iron saw is in use. It is noteworthy that toothed saws were unknown among the other people of antiquity.

The use of bronze for the manufacture of model animals or figurines shows the high technical achievement in metallurgy which the Indus people had attained. The method of casting of bronze was apparently the same as was followed even in later times at Nalanda being what is known as the *cire perdue* process. The bronze figure of a buffalo is artistically almost on a par with the seal cutter's art exhibited in the famous Brahmani bull seal and the faience monkey. The bronze dancing girl is as exceptional an example of art as the stone torso from Harappa.

It might be useful here to recapitulate the isolated finds of copper implements in Northern and Central India so as to help the future investigator in forging further links between the Indus Valley culture and the early copper age sites further east. Commencing from the western part of the United Provinces I may mention Rajpur in the District of Bijnor, where 16 copper objects including nine flat axes were found. At Mathura a number of

flat copper axes and harpoon heads were found in the Chaubara mound, and similar finds with harpoon heads provided with six barbs on either side were found in Mainpuri. At Sirthauli in Shahjahanpur District a copper spear head was discovered, which is now in the Lucknow Museum, and a similar find from the Etawah District is now in the British Museum. From Fatehgarh a human shaped copper object and a long heavy blade with a straight mid-rib running down the centre terminating at the butt end in a flat bank were discovered. In the Cawnpore District, Sheorajpur has yielded copper cult objects of human shape, and the harpoon heads, spears and celts, all of copper from Bithur in the same District are well-known. The present bed of the Ganges near Bithur apparently passes through ancient mounds of the copper age, as similar harpoons and celts are also recovered from the opposite bank at Pariar in Unao District. Kosam in the Allahabad District is the provenance of a small narrow celt 5″ long, and it is probable that the historic city of Kauśāmbi was founded on ancient settlements of the copper age. Bhita in the same District, which was partially explored by Sir John Marshall, has yielded some stone and copper objects from the lowest levels. At Bairant in the District of Benares Carlyle found some chert flakes and copper implements, and their occurrence on the opposite bank of the Ganges at Masaon Dih in the District of Ghazipur indicates the existence of a continuous chain of sites in this part as well. In the Central Provinces the large hoard of 424 hammered copper implements and 162 silver plates from Gungeria in the Balaghat District is the most outstanding discovery among the copper age finds. A flat celt of bronze with a long curve and a shap edge was also found in Jubbulpore. In the Chota Nagpur area, there are scores of copper age sites yet to be explored, but the find of pieces of small copper implements including three unfinished celts from Pachamba in the Hazaribagh District, is important. The existence of copper mines in the southern part of Chota Nagpur undoubtedly accounts for the number of extensive sites or mining settlements in this area. From Bengal the only recorded find is that from Tamajuri in the District of Midnapore, where a soldered copper celt was discovered. In the State of Mayurbhanj in Orissa ten double axes of copper were found at Bhagrapir, which at present constitutes the most southerly find of the copper age. The isolated finds enumerated here only point to the direction in which one has to look forward for more extended investigations, if the archæology of the period between the end of the Indus Valley culture and the beginning of the historical period is to be traced.

One of the most knotty problems regarding the Indus civilization has been its date. As has been stated before, the discovery of the city of Mohenjodaro followed the exploration of a stūpa of the Buddhist period assignable to the 2nd or 3rd century A.D., but the great gulf between the last occupation and the entirely different civilization below has, in no way, been filled up by any subsequent discovery in India. Several finds made in the excavations at Mohenjodaro, such as the discovery of single cuneiform letters, etched carnelian beads and toilet sets of definitely assignable periods in Sumerian chronology, have indicated the contemporaneity of the Indus culture with certain phases of the Mesopotamian cities, but the volume of evidence from the Sumerian sites is much greater, and scholars have pointed out over a dozen examples of seals of Indian style and workmanship. At least three different cities, namely, Ur, Kish and Tel Asmar in Mesopotamia have yielded seals of the typical square shape with Indian pictographs, and their find in strata, which can be assigned to the period 2,500 to 3,000 B.C., indicates the approximate age of the Indus culture. A cylindrical seal found by Dr. Frankfort at Tel Asmar shows the animals peculiar to the Indus region, namely, elephant, rhinoceros and *gharial*, which were unknown in Sumer. The knobbed ware mentioned before is another example of an Indus product found in Tel Asmar, which has also yielded some heart shaped inlay pieces made of bone, of the exact shape of the decorative shell fragments of the Indus Valley. The Tel Asmar finds belong to the early dynastic period of Iraq from 2,800 to 2,500 B.C. A vessel of light green steatite with a mat pattern found at Mohenjodaro has alsc been taken to furnish a link with the sites of Tel Asmar, Kish and Susa, where similar designs on an identical variety of stone have been found.[1] The shape of some beads, bull sports and double cross designs are among the affinities discovered by scholars in the Minoan and Indian civilizations, of which the earlier stages are con-

1. The most recent cultural link between India and Babylonia has bee found at Tel Agrab, a hitherto untouched site in the eastern desert by th Iraq Expedition of the Oriental Institute of the University of Chicago (*Illus trated London News*, Sep. 12, 1936). Here in a temple assignable roughly ' the 2800 B.C. Dr. Frankfort found a variety of votive offerings, amor which are included fragments of a green steatite vase depicting a Sumeria figure seated before a building in which a large Brahmani bull of the India type is standing before a manger. The rendering of the big hump, dew lap and horns is characteristically Sumerian, but the subject is purely India and indicates that the Bull cult had travelled to Sumer at so early a peric

temporary with the early dynastic periods of Egypt and Babylon. Among parallels discovered between the early Indian and Egyptian cultures are the copper terminals of necklaces or girdles and terracotta candle sticks and imitation shells, which served as spoons.

Although there are so many affinities observed between the Indus people and their contemporaries in the other lands, it cannot be definitely stated how communication between these distant parts was maintained. It is, however, likely that the intercourse was both by land and sea routes, and at least some part of the trade was in the hands of the Indus people. It is likely that with the advent of the Aryans and the shifting of the storm centre to more inland tracts in the upper Indus and Gangetic valleys, the chain of communications held through the inhospitable tracts of Baluchistan and South-East Iran as well as through the maritime routes of the Persian Gulf was broken ; otherwise there seems little reason why after the existence of such cultural and trade relations particularly with Sumer and Babylon in the earlier half of the 3rd millennium B.C., there should have been little evidence of contact between India on the one hand and the golden age of Hammurabi, the early Assyrian Empire and the middle and late kingdom in Egypt on the other.

One of the undoubted reasons for the decay and disappearance of the Indus civilization is the progressive desiccation of the lower Indus Valley. The evacuation of the cities of Mohenjodaro and Harappa, particularly the former, has been attributed to the growing danger of floods, which also necessitated its quick accumulation and rise in height, not commensurate with the period of its occupation. But if the Indus flood may account for the evacuation of one city, the same reason cannot hold good for the desertion of every other settlement of the period, of which there must have been several, dotting the surface of the present province of Sind and southwest Punjab. Climatic fluctuation must, therefore, be held to be one of the likely causes that led to the progressive abandonment of the Indus Valley by its civilized inhabitants. Just as Baluchistan, Central Asia and Sistan are known to have undergone progressive desiccation, Sind must also be held to have been subject to climatic cataclysms.

The marked paucity of means of defence, both in regard to structural defences, such as city walls, forts, etc., or weapons, probably indicates yet another reason for the disappearance of the Indus civilization. Perhaps the city dwellers, who were more

intent on carrying on their trade and commerce rather than pursue an adventurous career of fighting and conquest must have been unable to cope with hardier invaders from the neighbouring regions. The positions of some of the skeletons found in the excavations indicate the decapitation of women and children, which suggests that the inhabitants could not offer much resistance to marauders. Whether the wholesale migration of the people to an entirely different area, such as the west coast of the Peninsula, is to be taken for granted, as is done by the protagonists of the Dravidian theory will depend upon future discoveries. It may suffice to mention here that the only affinity of the incised black ware of the post-Mohenjodaro period of Sind is with the black pottery associated with the iron age finds in several sites on the Mysore plateau, the most important of which is Hattanhalli near Bangalore. Much more extensive research in Southern India would be necessary before definite links can be forged between the later stages of the Indus culture and the dawn of civilization in Southern India. The present attempt of certain scholars to explain the Indus language on the basis of the present Dravidian languages and find out the whole course of the Indus civilization by the supposed decipherment of the 'Dravidian' script is premature.

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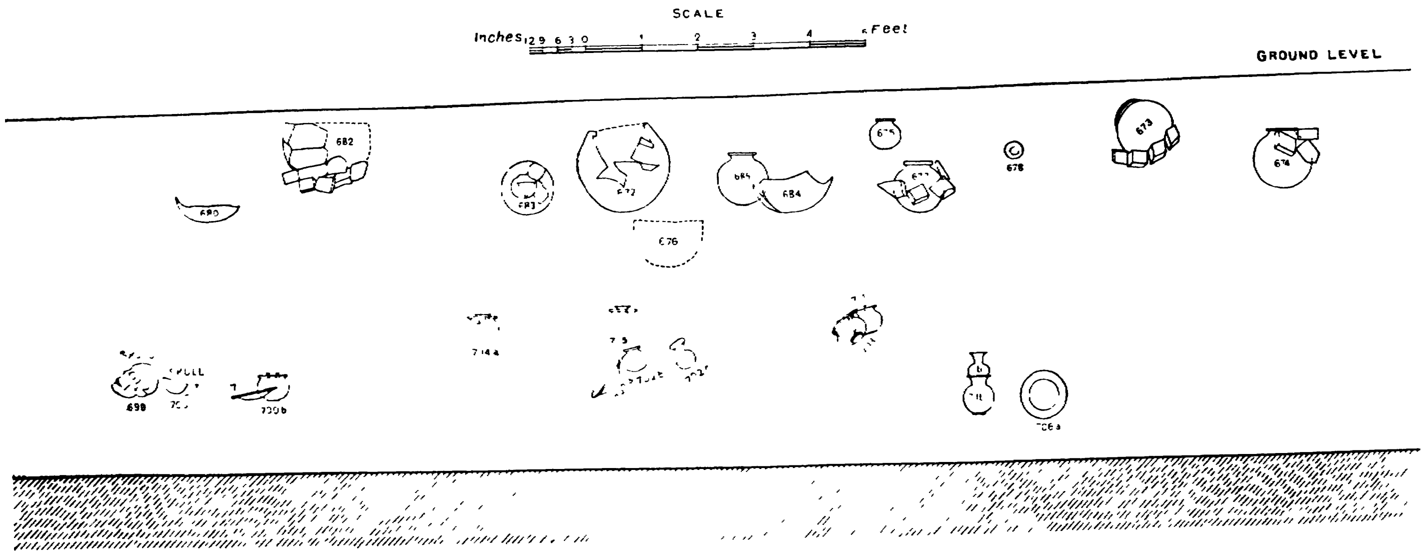
ILLUSTRATIONS

I MOHENJODARO SURVEY PLAN.



II(*a*). MOHENJODARO. PLAN OF EXCAVATIONS, AREA HR.

Harappa Site H
Northern Extension of Western Trench
Part Section on E F Showing Two Strata of Burials

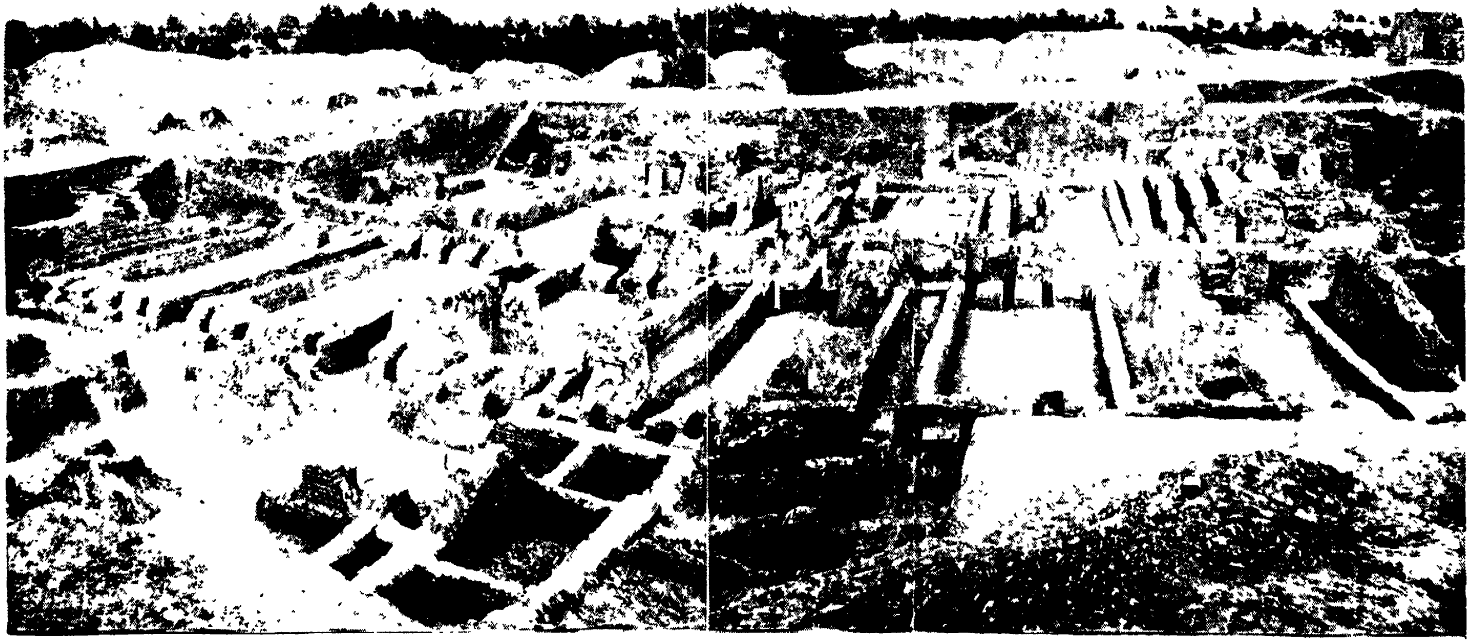




III(*a*). MOHENJODARO. A VIEW OF THE GREAT BATH.



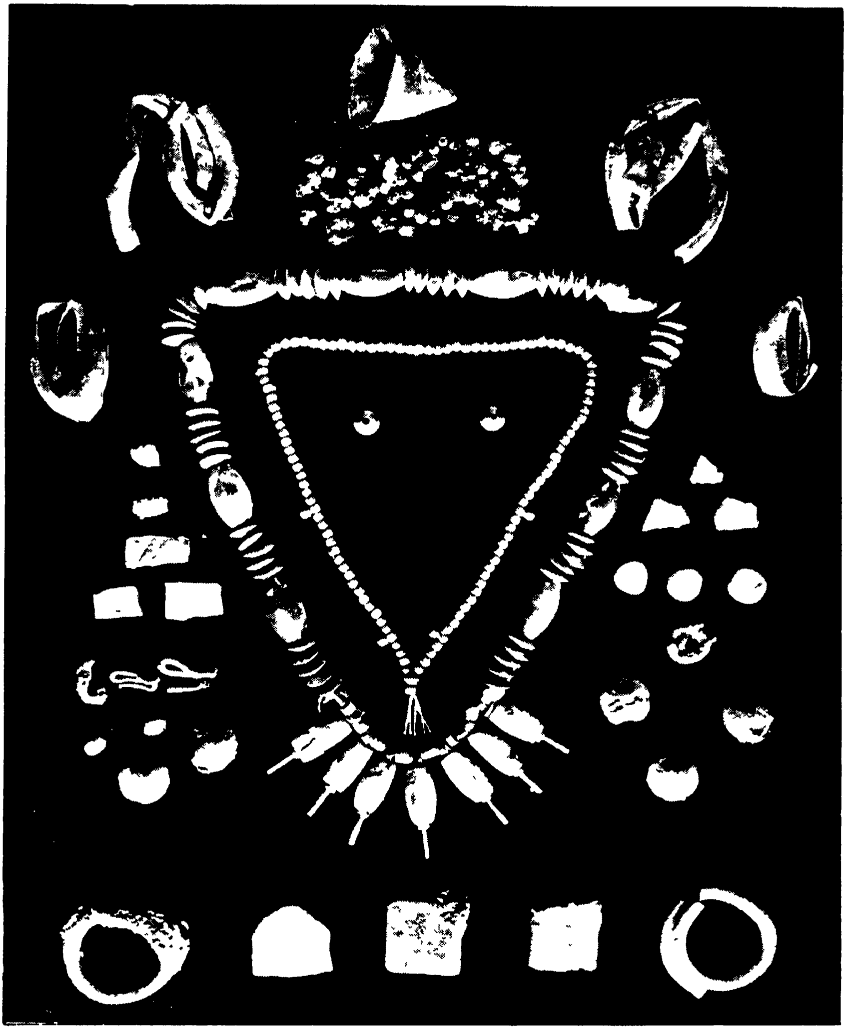
III (b). MOHENJODARO. A VIEW OF THE STREET.



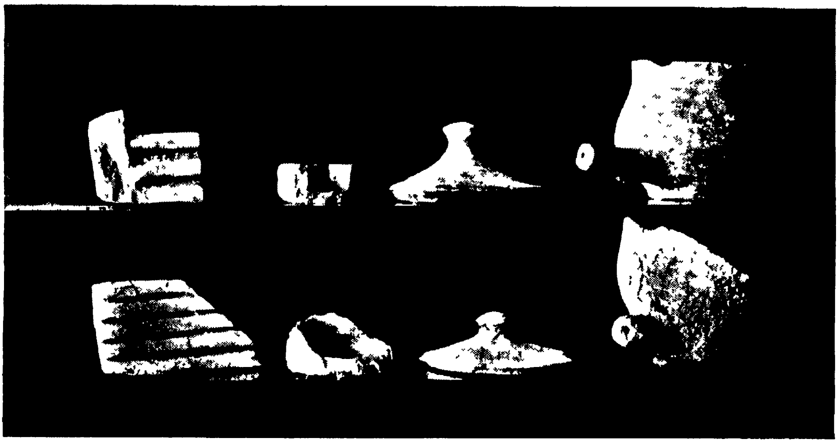
III (c). Harappa. Great Granary Area. Panoramic view.



IV (*a*). Mohenjodaro. Silver vase.



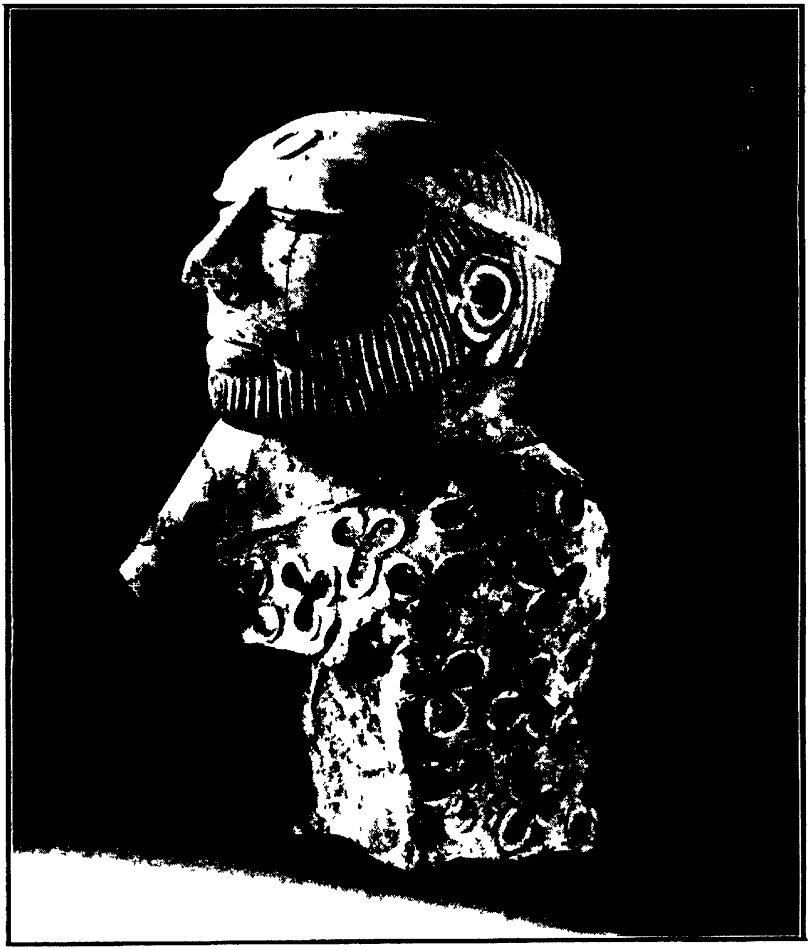
IV (*b*). MOHENJODARO. JEWELLERY.



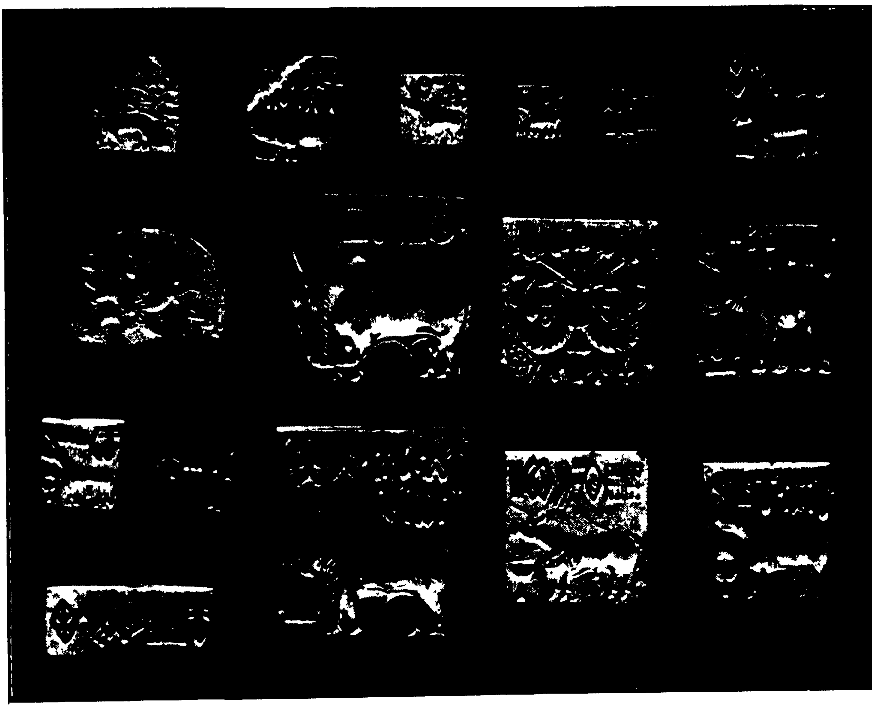
V(*a*). MOHENJODARO. COGNATE OBJECTS IN TERRACOTTA AND ALABASTER.



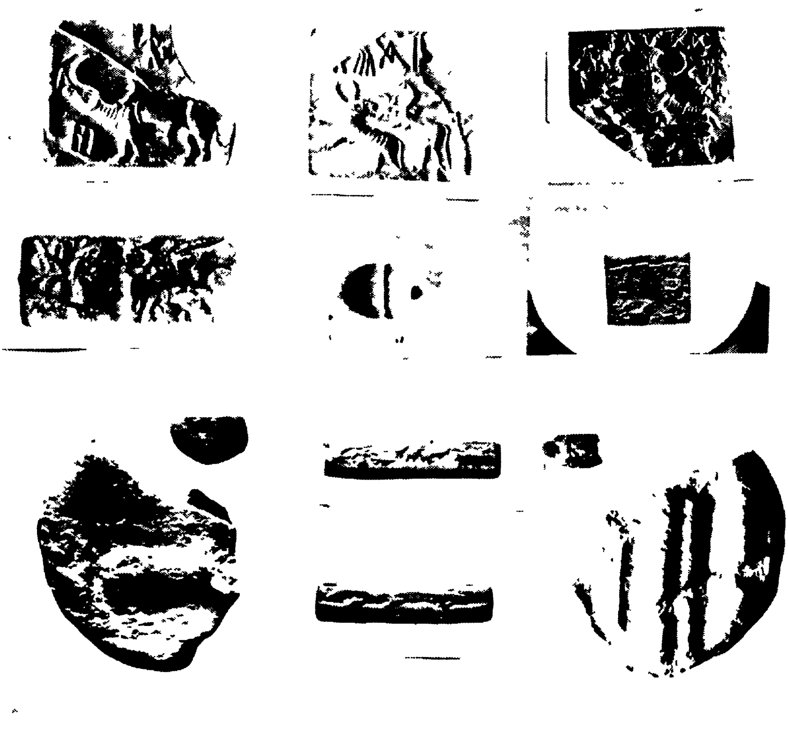
V (b). MOHENJODARO. PAINTED VASE.



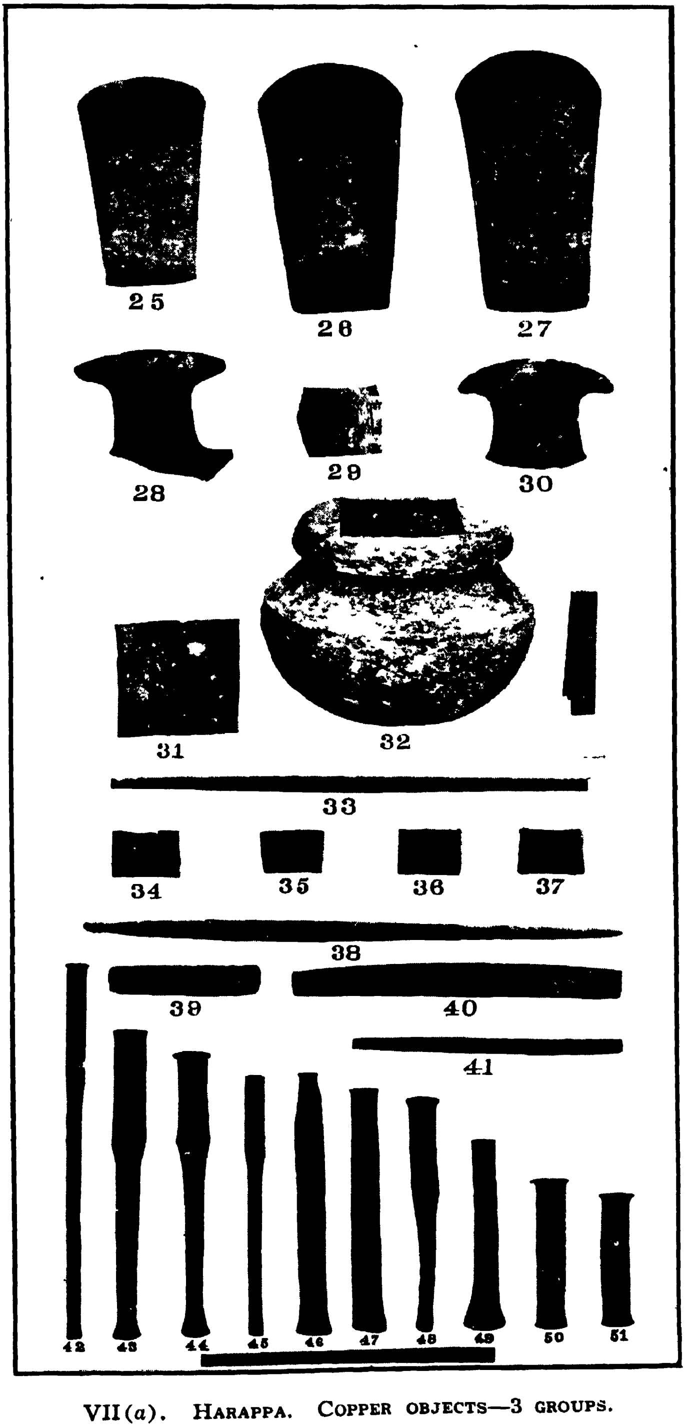
V (*c*). MOHENJODARO. LIMESTONE STATUE.



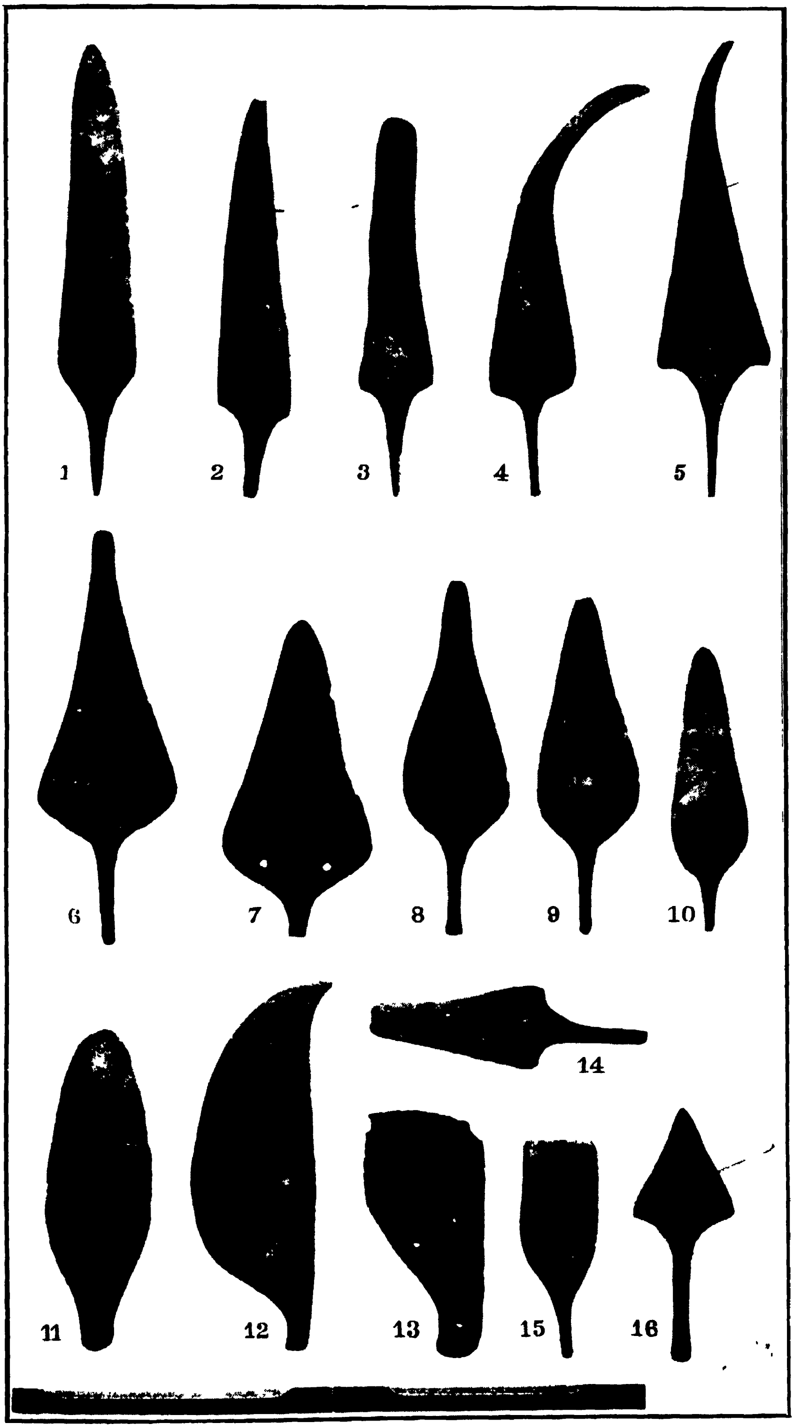
VI(*a*). MOHENJODARO. REPRESENTATIVE SEALS AND SEALINGS.



VI(*b*). MOHENJODARO. REPRESENTATIVE SEALS AND SEALINGS.



VII (*a*). HARAPPA. COPPER OBJECTS—3 GROUPS.



VII(*b*). HARAPPA. COPPER OBJECTS—3 GROUPS.

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